EQUITY OF ACCESS TO REPRODUCTIVE AND MATERNAL HEALTH SERVICES IN CAMBODIA: EQUITY TRENDS, POVERTY TARGETING AND DEMAND-SIDE FINANCING

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I, Antonia Emma Dingle, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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ABSTRACT

Health inequities are a serious public health concern. Achievements in health equity are particularly challenging to attain in reproductive and maternal health in developing countries. Research exploring this issue is of great relevance, given the extent of such disparities, and as pressure builds to include universal health coverage in the post-2015 development goals.

This thesis examines equity in reproductive and maternal health services in Cambodia, and two health financing interventions aiming to improve health equity, Vouchers for Reproductive Health Services (VRHS) and Health Equity Funds (HEFs). Study objective 1 was to estimate equity in reproductive and maternal health services in Cambodia over the last decade. Analysis was conducted with Demographic and Health Survey data for six health services between 2000 and 2010, revealing that dramatic improvements have been made in reproductive and maternal health equity since 2000, however inequity remains in use of facility-based deliveries and skilled birth attendance.

Objective 2 was to qualitatively explore Cambodia's poverty identification programme, the ID Poor. Semi-structured interviews were conducted with women, service providers and programme implementers. Extensive targeting errors within the programme were found, with implications for the targeting effectiveness of VRHS and HEFs.

Objective 3 was to qualitatively explore low uptake of vouchers in the VRHS project, also using interview data. It was found that vouchers were positively received by beneficiaries and had the potential to influence health-seeking behaviour. However several factors were found to improve future voucher performance.

Objective 4 assessed the impact of HEFs on financial protection, service utilisation and health outcomes, using difference-in-differences analysis. Evidence of a financially protective effect of HEFs was found; no effect was found for service use or health outcomes.

The thesis contributes to knowledge gaps in the health equity, poverty targeting and demand-side financing literature, and provides practical policy implications based on empirical findings.

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ABBREVIATIONS

AFD	Agence Francaise de Developpement
ANC	Antenatal care
BTC	Belgian Technical Cooperation
CBHI	Community-based health insurance
CBT	Community-based targeting
CCT	Conditional cash transfer
DID	Difference in differences analysis
DFID	Department for International Development, UK
DHS	Demographic and Health Survey
DSF	Demand-side financing
EmONC	Emergency obstetric and newborn care
FBD	Facility-based delivery
FP	Family planning
GDP	Gross domestic product
GIZ	Deutsche Gesellschaft fur Internationale Zusammenarbeit
GNI	Gross national income
HEF	Health equity fund
HEFI	Health equity fund implementer
HEFO	Health equity fund operator
HIV	Human immuno deficiency virus
HSP1	First Health Sector Strategic Plan, Cambodia
HSP2	Second Health Sector Strategic Plan, Cambodia

HSSP2	Health Sector Support Programme 2, Cambodia
HSV	Herpes simplex virus
JSY	Janani Suraksha Yojana, India
KHR	Khmer Riel
KfW	Kreditanstalt fur Wiederaufbau
LMICs	Low- and middle-income countries
MDG	Millennium Development Goal
MMR	Maternal mortality ratio
MOH	Ministry of Health
MOP	Ministry of Planning
MSI	Marie Stopes International
MT	Means testing
NFTIRM	National fast track initiative roadmap for reducing maternal and newborn mortality, Cambodia
NSPS	National Social Protection Strategy for the Poor and Vulnerable, Cambodia
OD	Operational district
OOP	Out of pocket
PCA	Principle component analysis
PHD	Provincial health department
PMT	Proxy means testing
PNC	Postnatal care
PP	Percentage points
PWR	Participatory wealth ranking
RCoG	Royal Government of Cambodia

RHAC	Reproductive Health Association of Cambodia
SBA	Skilled birth attendance
SDIP	Safe Delivery Incentive Programme, Nepal
SES	Socio-economic status
STI	Sexually transmitted infection
TBA	Traditional birth attendant
UNICEF	United Nations Children's Fund
URC	University Research Company
VMA	Voucher management agency
VRG	Village representative group
VRHS	Vouchers for Reproductive Health Services project

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CHAPTER 1 INTRODUCTION

1.1 The challenge of health equity

Inequities in the health of different social groups were observed as far back as the 19th century (Diderichsen et al., 2001; Williams et al., 2010). However today, despite improvements in health, particularly in developed countries, health inequities remain pervasive worldwide. Differences in health within a population per se are defined as health *inequality*, whilst health *inequity* can be understood as health differences between societal groups that are deemed unfair (Blas et al., 2010; Braveman et al., 2001; Graham, 2007; Machenback, J et al., 1997; Victora et al., 2001). It is the latter that is the concern of this thesis.

Currently more than one billion people globally are reportedly unable to reach the healthcare they need, and 150 million people experience financial catastrophe each year as a result of paying for healthcare (World Health Organisation, 2010). The difference in life expectancy at birth between the richest and poorest nations is a staggering 40 years (Commission on the Social Determinants of Health, 2008). In West Africa maternal mortality has been found to be more than twice as high in rural compared to urban areas (Ronsmans et al., 2003). Health inequities are found across and within countries for a vast portfolio of health outcomes, as well as for generalised health measures such as life expectancy at birth and all cause mortality (Marmot, 2005, 2007). The existence of such inequities has been dubbed "*the most serious public health threat of this century*" (Marmot, 2005). Furthermore there is little indication that such inequities are declining; they may even be widening (World Health Organisation et al., 2008). There is no biological basis for such large disparities (Blas et al., 2010; Braveman et al., 2001; Graham, 2007; Machenback, J et al., 1997; Victora et

al., 2001), yet they persist, to the detriment of the poorest and most disadvantaged. This thesis focuses on horizontal equity, which is considered to be achieved when there is 'equal treatment for equal need' (Culyer, A, 1995).

The right to health is a principle ratified by every nation on earth and is heralded by the World Health Organisation and the Office of the United Nations High Commissioner for Human Rights as a fundamental human right. This implies that every individual has a right to health services, goods and facilities that are accessible, available, acceptable and of good quality (Gwatkin, D, 2000, 2001; Gwatkin, Davidson et al., 2004; Thomsen et al., 2011; Wirth et al., 2006). Such systemic disparities in health, both within and between nations, are indicative of a failure in meeting the right to health of disadvantaged groups.

Addressing health inequities is complex, owing to the diversity of drivers that are understood to influence their existence (World Health Organisation, 2010). However an important factor is how health services are financed, and the extent to which financial barriers differ for vulnerable and disadvantaged groups compared to the rest of the population. Certain health financing mechanisms, specifically demand side mechanisms, are believed to offer potential in overcoming health inequities (United Nations General Assembly, 2012). Such mechanisms comprise part of the focus of this thesis.

1.2 Health equity in global policy

The Millennium Development Goals (MDGs) have been criticised for their lack of focus on health equity (Management Sciences for Health, 2013). Gwatkin et al (2004) illustrate that MDG5 on maternal health, which aims for a 75% reduction in maternal

mortality between 1990 and 2015, could be achieved without any improvement in maternal mortality of the poorest and most disadvantaged sectors of society, highlighting the importance of measuring and monitoring not only average improvements in health, but also improvements in health equity.

More recently, a focus on equity in health has gained increasing momentum within global and international policy, evidenced by the emerging consensus on striving for universal health coverage (UHC). UHC embodies the goal that all people have access to the healthcare they need, without suffering financial hardship, with a particular focus on poor, vulnerable and marginalised populations (World Health Organisation, 2010). UHC is believed to be the health sector's most important contribution to health and wellbeing, at the very core of which is the concept of health equity. UHC was endorsed in a United Nations resolution in 2012, co-sponsored by more than 90 countries, which states that Governments have a responsibility to *"significantly scale-up efforts to accelerate the transition towards universal access to affordable and quality healthcare services"* (United Nations General Assembly, 2012). Many civil society organisations are currently advocating for UHC to be included as one of the post-2015 development goals (Management Sciences for Health, 2013). This reflects the level of global recognition of the importance of UHC and health equity, integral to which is how healthcare for those currently with no or limited access is financed.

The approach towards UHC and health equity is suggested by the WHO to embody three issues – raising sufficient resources to fund health systems, reducing the need for direct payments to finance services, and improving efficiency and equity in use of resources within the health system (World Health Organisation, 2010). As such health financing can be understood as key to achieving greater health equity.

1.3 Equity in reproductive and maternal health

Reproductive and maternal health is a particular area of health in developing countries in which achievements in health equity are currently challenging to attain. The lifetime risk of a maternal death[1] is one in six for a woman of reproductive age in Afghanistan and Sierra Leone, whilst it is one in 30,000 in Sweden (Bhutta et al., 2010). This has been termed the "*largest discrepancy in public health statistics*" (Www.mdg5b.org, 2011).

Historically the maternal health field has not focused on such inequities. Ronsmans and Graham (2006) highlight that "*Persistent emphasis on global differences and strategies for maternal health has often entailed a neglect of biological, geographical, economic and social differences in maternal mortality within populations*" (Ronsmans et al., 2006). However the inclusion of MDG5B on universal access to reproductive health in 2008, growing advocacy, and increasing research, have all contributed to a burgeoning focus not only on overall maternal health, but also on its distribution within and between countries. Yet whilst there has been some reduction in global maternal mortality in recent years (Bhutta et al., 2010), MDG5, particularly MDG5B on universal access to reproductive health, remains the most off-track of the MDGs (Kassebaum et al., 2014). It has been estimated that across 12 reproductive, maternal and child health interventions in 68 developing countries, disparities across socio-economic groups are greatest in the use of antenatal care (ANC), skilled attendance at birth and postnatal care (PNC) (Bhutta et al., 2010; Countdown 2008 Equity Analysis

[1] Defined as death during pregnancy or within 42 days postpartum from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes (ICD-10).

Group, 2008). The average gap between current health coverage and 100% coverage in developing countries in accessing at least four antenatal care visits is 50%; in skilled attendance at birth is 46%; and in postnatal care is 62% (Bhutta et al., 2010).

Research exploring health equity, and specifically equity in reproductive and maternal health is currently of great relevance, given the extent of disparities that exist in this area and as we approach the final year of the MDGs, and global pressure builds to acknowledge health equity as one of the key health challenges of our time. This thesis examines equity in reproductive and maternal health services in Cambodia, and several health financing interventions currently being implemented that aim to improve health equity, specifically vouchers and health equity funds.

1.4 Structure of the thesis

This thesis has been structured using a paper-based format, whereby the results relating to each of the study objectives were developed in the style of individual research papers, subsequently to be submitted for publication in academic journals. Research paper 1 has already been published. The thesis comprises the following structure: Chapter 2 reviews the literature relevant to the study topic, focusing specifically on three areas. Firstly, empirical evidence of equity in reproductive and maternal health in developing countries is reviewed. The second section covers the outcomes and implementation successes and challenges of demand-side financing interventions for reproductive and maternal health in developing countries, specifically considering vouchers, and demand-side financing incentives, including conditional cash transfers. Finally, evidence regarding strategies for targeting social

benefits to the poor in developing countries is reviewed, including a discussion of frameworks for evaluating targeting strategies.

Chapter 3 discusses the country setting for the thesis, Cambodia. This includes an overview of the current socio-economic and political situation, a description of Cambodia's health system and discussion of how health equity features in its health policies. The chapter then details the situation in terms of reproductive and maternal health in Cambodia. This is followed by a discussion of health financing within the country, with specific focus on health equity funds and the vouchers for reproductive health (VRHS) project, two interventions targeting the poor in Cambodia, which form part of the focus of this thesis. The chapter also provides an overview of the ID Poor Programme, the national system in Cambodia for identifying poor households, which is also addressed in the thesis.

Chapter 4 details the empirical methods used within the thesis. An overview of the study aims and objectives is presented, followed by a discussion of the conceptual frameworks drawn on throughout the thesis. The empirical methods used in conducting the equity analysis, the collection and analysis of primary qualitative data for the thesis, the approaches to analysing distribution and use of vouchers within VRHS, and methods for conducting a difference in differences analysis of HEF outcomes are all described in detail.

The thesis comprises four papers, presented in Chapters 5-8. Each paper corresponds to a study objective. Chapter 5 presents Research Paper 1, an analysis of trends in equity of six reproductive and maternal health services in Cambodia between 2000 and 2010 based on secondary household survey data. The analysis incorporates use of

several different methods for estimating equity – equity gaps, equity ratios, concentration curves and concentration indices. This paper has been peer reviewed and published. Chapter 5 includes supplementary results and discussion of analysis that were not included in the published paper.

Research paper 2 in Chapter 6 explores peoples' perceptions and experiences of the ID Poor programme in Cambodia, which is used to distribute vouchers and HEF cards to poor households. The paper draws on primary qualitative data generated for the purposes of the thesis. Research paper 3 in Chapter 7 investigates the low uptake and vouchers for family planning and safe motherhood services, implemented by VRHS. This paper incorporates analysis of secondary quantitative data from the VRHS project, and primary qualitative data generated for the purposes of the thesis. Chapter 7 includes supplementary analysis and discussion of findings that were not included in the paper for publication.

Research paper 4 in Chapter 8 estimates the outcome of HEFs on reproductive and maternal health service utilisation, a range of health outcomes, and financial protection, using a difference-in-differences analysis with secondary quantitative data. Each paper in Chapters 5-8 includes an individual discussion section, which relates the empirical findings to the existing literature, and highlights the limitations of the individual papers.

Chapter 9 brings together the findings from the overall thesis and develops a revised conceptual framework as a result of the empirical research conducted. The limitations of the thesis are discussed, as well as its contributions to the evidence base on equity of

access to reproductive and maternal health services. Finally, policy implications from the thesis and areas for further research are proposed.

CHAPTER 2 LITERATURE REVIEW

The thesis topic demands an understanding of several broad areas of literature relating to the magnitude of and trends in (in)equity in reproductive and maternal health, how poor and marginalised groups who typically suffer from inequity in reproductive and maternal health can be identified in order to improve their health, and demand-side financing in health, specifically evidence regarding how this is used to improve service use and health outcomes for disadvantaged groups. This literature spans epidemiology, economics, health services research, social protection and also touches on the education and agricultural sectors. A wide search was conducted in order to gain a detailed understanding of these topic areas. Specifically, the reviews conducted focus on equity in reproductive and maternal health in low- and middle-income countries (LMICs), identifying the poor in LMICs (including discussion of universal fee removal and evidence on Cambodia's Health Equity Funds), and targeted demand side financing for reproductive and maternal health in LMICs. The evidence gathered from these reviews and the gaps in knowledge they identified were used to guide the focus of the thesis, develop study objectives, and inform interpretation of findings presented in subsequent chapters.

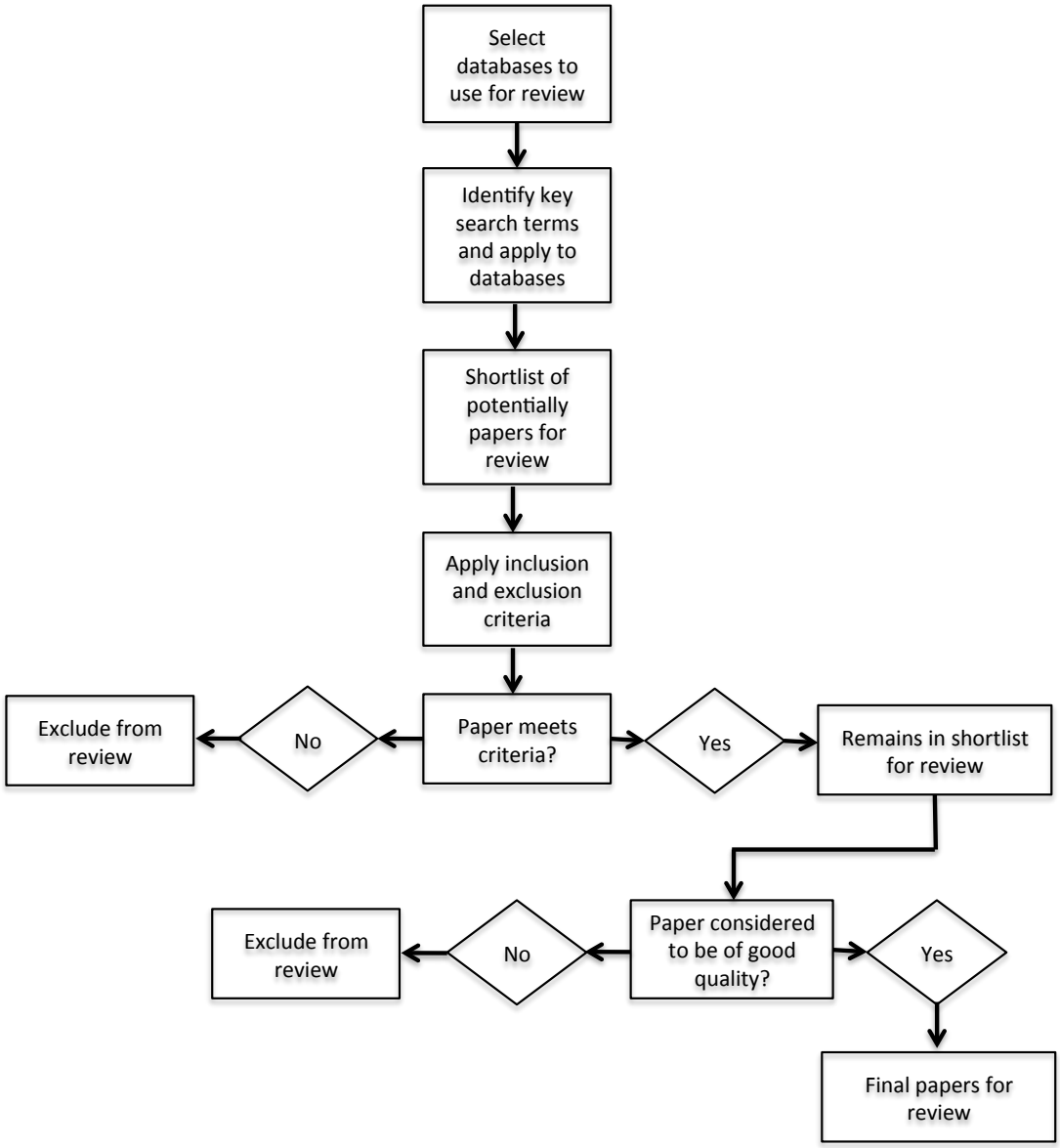
Multiple databases were searched in conducting these reviews, including Global Health, Embase, Medline, Econ Lit and Pubmed. Search terms related to the following topics were applied in each database, with search terms combined using Boolean operators: health equity, demand-side financing, reproductive health, maternal health, access to services, poor and marginalised groups. Inclusion and exclusion criteria were applied to search results, to select individual studies for review. These criteria were kept deliberately quite broad to ensure all literature relating to these topics was

captured through the searches. The criteria applied are detailed in table 2.1 below. For studies that met the inclusion criteria, an assessment of their quality was also made by scrutinising the methodology used for example the data sources, and application of analysis approaches. Studies judged to be of poor quality were excluded from the reviews. Bibliographies of reviewed articles were also searched for potentially relevant papers to include in the reviews, for which inclusion/exclusion criteria were also applied. The flow diagram in figure 2.1 outlines the process undertaken in conducting these literature reviews.

Table 2.1 Inclusion and exclusion criteria for literature reviews

Inclusion criteria	Studies using the following equity methods: equity ratios, slope index of inequality or relative index of inequality, logistic regression, concentration curves, concentration indices
	Publications since 2000 to 2015
	English language papers
	Appropriate description of sampling strategy used
	Using data from LMICs
Exclusion criteria	Purely descriptive studies
	Publications pre-2000
	Non English-language papers
	Studies with weak or poor sampling strategy
	Using data from high income countries

Figure 2.1 Literature review process



2.1 Equity in reproductive and maternal health in low- and middle-income countries

As established in Chapter 1, disparities in reproductive and maternal health service use and outcomes between countries, and also within developing countries, are of critical importance and represent a key health challenge of the twenty-first century. This review focuses on the current evidence regarding the nature and magnitude of inequities in reproductive and maternal health in developing countries. 38 papers were included in the final review. Evidence has been grouped according to service type and outcome. The following sections outline evidence from these papers of inequities in: maternal mortality; use of maternal health services including antenatal care (ANC), use of skilled birth attendants (SBA) during delivery, caesarean section and postnatal care (PNC); and use of reproductive health services including contraceptive use, unmet need for contraception, use of abortion services and unwanted pregnancy. The review concludes with a discussion of evidence gaps.

2.1.1 Inequities in maternal mortality

Maternal mortality is challenging to measure; maternal deaths are relatively rare events and require substantial sample sizes for accurate estimates. As such, there is little evidence on inequities in maternal mortality across sub-populations. Of the 38 papers reviewed just three included maternal mortality as an outcome. The evidence from these papers suggests there are severe inequities in maternal mortality between countries and regions, as well as by wealth quintile and between urban and rural areas. Kassebaum et al (2014) report substantial differences in regional maternal mortality ratios (MMR) ranging from 468 per 100,000 live births in Western sub-Saharan Africa, with the rate reducing on average by 0.1% per year between 1990-2013, to 6 per 100,000 live births in Western Europe, reducing on average by 3% per year

(Kassebaum et al., 2014). Similar regional disparities have been reported in other studies, as well as disparities in maternal mortality within individual countries by socio-economic status, and urban-rural location. For example, in China substantial inequity in maternal mortality favouring the poor has been reported by urban/rural county; the extent of inequity between urban and rural areas remained fairly constant between 1996 to 2006 (Feng, XL et al., 2010).

2.1.2 Inequity in use of maternal health services

Of the 38 papers reviewed, 35 estimated equity in use of maternal and reproductive health services. The majority of these conducted analyses using multivariate logistic regression to generate odds ratios, or adjusted odds ratios, typically comparing the two most extreme groups e.g. highest and lowest wealth quintile. Only five studies used robust equity measures such as concentration indices. Nearly all studies included a measure of wealth as a social stratification variable, by which equity in use of services was assessed; approximately half of studies included a measure of education (womens', mens' or both) and just over a third of studies considered disparities in service use by rural/urban location. More than half of the studies reviewed used multiple social stratification variables in their analysis. Table 2.1 presents a summary of the characteristics of studies estimating equity in service use; Figures 2.1 and 2.2 graphically illustrate variation in methodology and variables of socio-economic status within the studies. Summary results of reviewed papers are presented in Appendix 1.

Table 2.2 Characteristics of studies of inequity in use of reproductive and maternal health services in developing countries

Country, Author, Year	Equity methodology	Social stratification variables	Service use outcomes
Bangladesh, Amin et al, 2010	Logistic regression	Wealth, maternal education, paternal education	ANC by skilled provider, SBA, PNC by skilled provider
Bangladesh, Chowdury et al, 2006	Logistic regression	Wealth, maternal education, paternal education	SBA during home delivery, SBA at FBD
Bangladesh, Collin et al, 2007	Logistic regression	Wealth, maternal education, rural-urban location	1+ ANC, SBA, delivery by caesarean section
Bangladesh, Rahman et al, 2008	Logistic regression	Wealth	ANC, SBA
Bangladesh, Zere et al, 2013	Slope index of inequality, relative index of inequality	Wealth	4+ ANC, SBA, TBA, FBD, home delivery, caesarean section, modern contraception
China, Feng et al, 2011	Rate ratios	Wealth, rural-urban location	FBD, trends in FBD
Columbia, Gonzalez et al, 2010	Relative index of inequality	Wealth	Current non-use of contraception among sexually active women, never use of contraception among sexually active women
Ethiopia, Amano et al, 2012	Logistic regression	Maternal education, paternal education, rural-urban location	FBD
Ethiopia, Hagos et al, 2014	Logistic regression	Wealth, maternal education	FBD
Ethiopia, Mengesha et al, 2013	Logistic regression	Maternal education, rural-urban location	SBA
Ghana, Arthur, 2012	Logistic regression	Wealth, maternal education, rural-urban location	ANC
Ghana, Zere et al, 2012	Slope index of inequality, relative index of inequality	Wealth	SBA, FBD, delivery in public facility, delivery in private facility, home delivery, caesarean section, use of modern contraception
India, Karnataka, Adamson et al 2012	Logistic regression	Caste, poverty status	FBD
India, Uttar Pradesh, Bacqui et al, 2008	Concentration index	Wealth	1+ ANC, SBA
India, urban, Goli et al, 2013	Concentration index	Wealth	Less than 3 ANC, non-institutional delivery

India, Mohanty et al, 2006	Concentration index	Wealth	3+ ANC, SBA, use of contraception, unmet need for contraception
India, Pakilladavath et al, 2004	Logistic regression	Maternal education, paternal education, religion	ANC
India, Saxena et al, 2013	Logistic regression	Wealth, education, caste, rural-urban location	Less than 3 ANC, non facility-based delivery, non use of modern contraceptives
India, rural, Singh et al, 2012	Logistic regression	Wealth, maternal education, paternal education, caste	Comprehensive ANC, SBA
India, Zavier and Padmadas, 2012	Logistic regression	Wealth, rural-urban location, education, caste	Permanent post-abortion contraceptive use, modern temporary post-abortion contraceptive use
Kenya, urban, Fotso et al, 2013	Logistic regression	Wealth, maternal education	Modern contraceptive use
Kenya, Ochako et al, 2011	Logistic regression	Wealth, maternal education, rural-urban location	ANC in 1st trimester, no ANC, SBA, no assistance at delivery
Multicountry, Countdown 2008 Equity Analysis Group	Equity ratios	Wealth	Family planning, maternal and newborn care, immunisation, treatment of sick children
Multicountry, Kunst and Houweling, 2001	Equity ratios	Wealth	SBA, ANC by skilled provider, modern contraception, full immunisation of children 12-23 months
Multicountry, Ronsmans et al, 2006	Equity ratios, equity gaps	Wealth	Caesarean section
Multicountry, 45 LMICs, Houweling et al, 2007	Descriptive, exponential curves of the association between equity ratio and coverage	Wealth	Median % ANC, median % delivery care, comparison of five types of healthcare use
Namibia, Zere et al, 2010, Namibia	Concentration index, equity ratio, descriptive	Wealth, rural-urban location, maternal education	ANC by skilled provider, private ANC provider, public ANC provider, SBA, delivery attended by a doctor, delivery attended by a nurse/midwife, TBA, delivery in private facility, delivery in public facility, caesarean section, PNC
Nepal, Neupane and Doku, 2012	Logistic regression	Wealth, maternal education, rural-urban location	Start ANC after 1st trimester, Less than 4 ANC
Pakistan, Agha and Carton, 2011	Logistic regression	Wealth, maternal education	3+ ANC, FBD, PNC, Current use of family planning
Republic of Vanuatu, Rahman et al, 2011	Logistic regression	Wealth, maternal education, rural-urban location	ANC by skilled provider, SBA, FBD
Sudan, Ali and Okud, 2013	Logistic regression	Woman's education, husband's education	Unmet need for contraception

Tanzania, Exavery et al, 2014	Logistic regression	Wealth, rural-urban location	FBD
Vietnam, Axelson et al, 2012	Concentration index	Wealth, maternal education	Modern family planning, 1+ ANC by skilled provider, 4+ ANC by skilled provider, FBD, SBA
Vietnam, Malqvist et al 2013	Logistic regression	Wealth, maternal education, ethnicity	No skilled ANC, Home delivery
Zimbabwe, Muchabaiwa et al, 2012	Logistic regression	Wealth, maternal education, rural-urban location	ANC, FBD, PNC
ANC = antenatal care; SBA = skilled birth attendance; FBD = facility based delivery; PNC = postnatal care; TBA = traditional birth attendant			

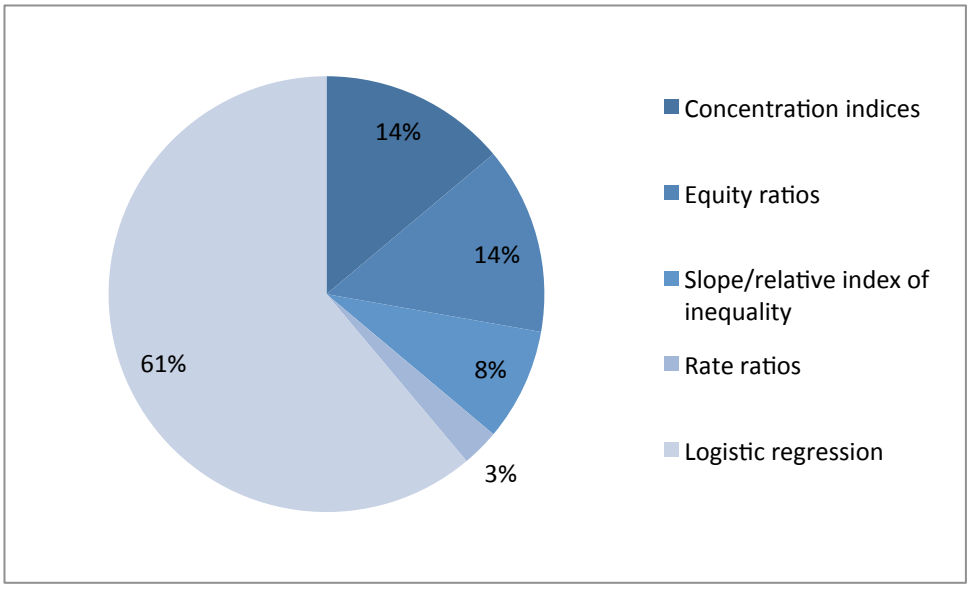


Figure 2.2 Equity methodology used within papers reviewed on equity in reproductive and maternal health service use

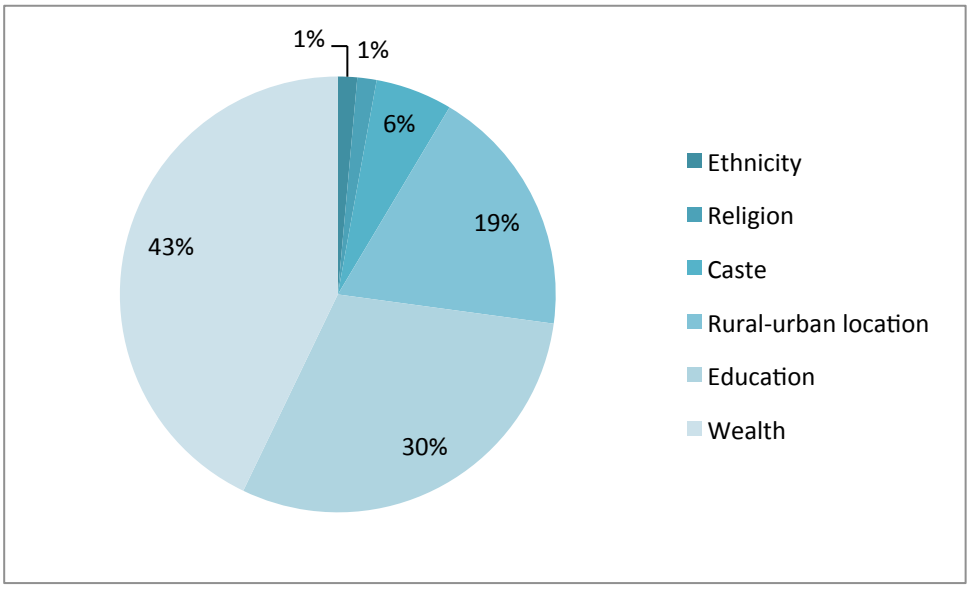


Figure 2.3 Variables of socio-economic status used within papers reviewed on equity in reproductive and maternal health service use

Antenatal Care

ANC plays a critical role in detecting pre-eclampsia and anaemia and has been associated with reduced rates of perinatal mortality in LMICs; it is therefore recommended for all pregnant women (Pallikadavath et al., 2004). Particularly in rural areas, ANC is an opportunity for women to engage with the health system and provides scope to deliver other services such as HIV testing and health education or promotion (Pallikadavath et al., 2004).

The majority of the studies reviewed, apart from three (Axelson et al., 2012; Neupane et al., 2012; Zere et al., 2013), did not include indicators for at least four ANC visits, as per the WHO recommendations. Rather, indicators typically referred to ANC1, ANC2 or ANC3 (see table 2.1). There is much evidence of inequities in the use of ANC by wealth status, with poorer populations less likely to access ANC than wealthier ones. For example, in Bangladesh, wealthier women were 7.6 times more likely to use modern

providers for ANC compared to poorer women (Rahman, M Hafizur et al., 2008). In Vietnam trends in equity in use of at least four ANC visits has improved over time, but currently still favours wealthier women (Axelson et al., 2012). Similar results have been found in India, Pakistan, Nepal, Ghana, Zimbabwe, and in multi-country studies (see Appendix 1). However, not all studies report a wealth effect for use of ANC favouring the richest. For example in Namibia use of ANC was almost equal by wealth status, with a concentration index of 0.013, although wealthier women were significantly more likely to use private ANC providers and to receive ANC (Zere et al., 2010). In Ethiopia wealth was not found to have a significant effect on likelihood of using ANC from a skilled provider, compared to poorer women (Worku et al., 2013).

The evidence is inconsistent regarding the overall trend in use of ANC between urban and rural women, with urban women in some countries using ANC more than rural women, but not in all studies. The evidence regarding inequities in use of ANC by education was also mixed. In rural northern India increased levels of both maternal and paternal education was significantly associated with increased likelihood of receiving ANC; women with higher education also tended to use facility-based rather than home-based ANC (Kumar et al., 2013; Saxena et al., 2013). Similar results were found in Bangladesh, Ethiopia, Ghana, Vanuatu, Pakistan, Zimbabwe and Nepal (see Appendix 1). However in Namibia more than 75% of all women, from those with no education to more than secondary education, used ANC (Zere et al., 2010). In Kenya whilst more educated women were more likely to have any ANC, uneducated women were found to be almost twice as likely to have ANC within the first trimester of pregnancy than more educated women (Ochako et al., 2011).

The two studies which examined use of maternal health services by social class or caste, both focused on India, tended to find that higher caste women were significantly more likely to use more ANC services than lower caste women (Kumar et al., 2013; Saxena et al., 2013).

Skilled birth attendance

Skilled birth attendants (SBA) are defined as doctors, nurses or midwives, as opposed to traditional birth attendants or other non-medically trained individuals (Collin et al., 2007). SBA may be accessed during home deliveries or in health facilities. The presence of SBA, supported by the existence of referral-level facilities, is perceived as a key strategy for achieving MDG5 (Collin et al., 2007). International policy states that all pregnant women, regardless of health status, should be considered in need of at least an SBA at delivery (Chowdhury et al., 2006).

Overall there is extensive evidence of substantial disparities in use of SBA between rich and poor in developing countries, favouring the rich. Kunst and Houweling (2001) find stark disparities in the use of delivery care in developing countries, with the richest women far more likely to access a SBA than the poorest. They also report evidence of a social gradient in use of SBAs with utilisation rates increasing with each wealth quintile; "*rich-poor disparities pervade the entire society, and not only affect the poorest women as compared to all other women*" (Kunst, A et al., 2001). In Bangladesh women in the highest wealth quintile were approximately twice as likely to have SBA for both home- and facility-based deliveries (Chowdhury et al., 2006). In Kenya women in the wealthiest quintile were three times more likely to have SBA at delivery than the poorest women (Ochako et al., 2011). Similar findings have been reported for India,

Namibia, Vanuatu, Ethiopia, Ghana, Zimbabwe, Tanzania, Vietnam and Pakistan (see Appendix 1).

Urban-rural disparities in use of SBA favouring urban women are prominent in the literature. For example, in Namibia inequity in the use of SBA was found favouring urban women (concentration index = 0.09), whilst inequity in delivering with a traditional birth attendant was found favouring rural women (concentration index = -0.47) (Zere et al., 2010). Similar disparities have been reported for Bangladesh, Zimbabwe, and Ethiopia (see Appendix 1).

Studies focusing on use of SBA by level of education all report the presence of inequities favouring the more educated, for example in Namibia, Bangladesh, Ethiopia, Kenya, Zimbabwe, Vanuatu, Pakistan, and India (see Appendix 1). Kumar et al (2013) report disparities in use of SBA by adolescent (15-19 years) women in India between 1990 and 2006 across multiple socioeconomic variables, with wealthier, more educated, higher caste and urban adolescents significantly more likely to use SBA. This finding is particularly noteworthy as, with high levels of child marriage in India, pregnant adolescent girls are a particularly vulnerable group; 60% of married 15-19 year olds are in the poorest two wealth quintiles (Kumar et al., 2013).

In India, lower caste women from scheduled castes and scheduled tribes were significantly less likely to have institutional deliveries, compared to higher caste women (Adamson et al., 2012; Saxena et al., 2013).

Fapohunda et al (2013) report that in Nigeria, one in five deliveries occur with no one present. These solitary deliveries are significantly more likely to occur amongst Islamic women, women with higher birth parity, women in the North West region of

Nigeria, and older women (Fapohunda et al., 2013). However these findings are based on data from the DHS 2008; DHS 2013 suggests that incidence of solitary delivery over the last five years has reduced to 13.4% on average, just over one in eight.

Several studies report the existence of different types of inequity in use of SBA across countries (Countdown 2008 Equity Analysis Group, 2008; Kunst, A et al., 2001). 'Top inequality' reflects a disparity between the top quintile and the rest of the population; 'bottom inequality' is a disparity between the bottom quintile and the rest of the population; linear inequality reflects more of a social gradient, whereby disparities progressively increase across consecutive quintiles. Kunst and Houweling (2001) found evidence of top inequality in countries with low national prevalence rates of service use such as Chad, Niger, Bangladesh, whilst countries with a high overall prevalence rate of service use were characterised by bottom inequality, such as Vietnam, Turkey, Columbia (Kunst, A et al., 2001). Inequality in a range of maternal and newborn care interventions in Cambodia is reported to have changed over time, from a former predominance of top inequity, changing since 2005 into a linear inequity trend, with access to services decreasing progressively with each quintile (Countdown 2008 Equity Analysis Group, 2008).

Postnatal care

There is less evidence in the literature of equity in access to postnatal care. Four out of the 35 studies reviewed included use of PNC as an outcome, from Namibia, Bangladesh, Pakistan and India (see Appendix 1). In these studies wealthier and more educated women were significantly more likely to use PNC compared to their counterparts. For example in rural Pakistan wealthier and more educated women were 2.92 and 1.84 times more likely to use PNC than poorer and less educated counterparts, respectively (Agha, S et al., 2011).

Caesarean section

The United Nations recommend population-based caesarean section rates should be between 5-15% (WHO et al., 1997). Whilst this threshold is subject to some debate, it is suggested that caesarean rates of less that 1% certainly indicate an unmet need for potentially life-saving care, whilst high rates of caesarean represent an over-medicalisation of delivery care (Duborg et al., n.d.). There is evidence of inequities in use of caesarean sections in developing countries, with wealthier, more educated and urban women typically more likely to have a caesarean than poorer, less educated and rural women. For example in Ghana there was a 200% increase in likelihood of caesarean section amongst the wealthiest women, compared to the poorest, or a 15 percentage point increase (Zere et al., 2012). Collin et al (2007) suggest a composite effect of social factors on caesarean sections in Bangladesh with 35% of the richest urban women with secondary or higher education reporting caesarean sections compared to 0.1% of uneducated rural women in the poorest quintile (Collin et al., 2007). Similar findings are also reported for Namibia, and Bangladesh (see Appendix 1).

2.1.3 Inequity in use of reproductive health services

Of the 35 studies reviewed of equity in reproductive and maternal health services, 13 included variables relating to reproductive health specifically. The most commonly used method of analysis was logistic regression. Two out of the 13 studies used concentration indices, three used slope indices of inequality and two used equity ratios in their analysis. The most prevalent social stratification variable used was wealth, followed by education.

Contraceptive use and unmet need for contraception

Women with an unmet need for contraception are defined as those who are fecund and sexually active, but not using any method of contraception, and who report not wanting any more children, or wanting to delay their next child (World Health Organisation, 2014a). There is some evidence from Asia that socioeconomic inequities in contraceptive use and unmet need for contraception are narrowing in India and Vietnam (see Appendix 1). In urban Kenya the gap between rich and poor in use of modern FP has reduced over time such that in 2008 it was negligible, although wealthier and more educated women are twice as likely to use long acting and permanent methods (LAPMs), compared to short term methods (Fotso et al., 2013).

However several studies suggest evidence of continuing inequity in contraceptive use, including from India, where poor, illiterate women were found to be 1.3 to 1.4 times significantly more likely to *not* be using modern contraceptives compared to rich, literate women (Rahman, Mosiur et al., 2011). Similarly in Columbia inequity was found in non-use and never use of contraception between wealth quintiles, with non-use and never use higher amongst the poorest compared to the richest. The magnitude of socioeconomic inequity was also greater in rural compared to urban areas of Columbia (González et al., 2010). Comparable findings have been reported Ethiopia, Ghana, Kenya and Pakistan, Tajikistan, and Cambodia, and by level of education, and rural/urban location (see Appendix 1). For example, in Eastern Sudan women with less than secondary education were found to be almost eight times more likely to have unmet need for contraception (Ali et al., 2013).

Abortion services and unintended pregnancy

The burden of unintended pregnancy in most countries disproportionately affects the poor, young, uneducated, ethnic minority and migrant groups (Malarcher et al., 2010). In Burkina Faso significantly higher rates of unwanted pregnancies were reported amongst the urban poor compared to the non-poor, however the opposite was found for Namibia and Mozambique (Magadi et al., 2003).

Complication rates for safe abortion procedures are extremely low; the majority of abortion-related morbidity and mortality is the result of unsafe abortion procedures (Malarcher et al., 2010). Malarcher et al (2010) report that rates of unsafe abortion are higher amongst young women, whilst there is evidence of higher complication rates and mortality from unsafe abortion amongst women of lower SES (Malarcher et al., 2010). In India poorer, rural, less educated and lower caste women were significantly less likely to use modern contraceptive methods as part of post-abortion care, and rural, less educated women are more likely to discontinue the use of contraception after receiving post-abortion care (Zavier et al., 2012).

2.1.4 Discussion and evidence gaps

The literature reviewed above illustrates that a growing body of evidence is available assessing the nature and extent of equity in reproductive and maternal health in developing countries. A strong, consistent picture is provided of extensive inequity in access to SBA during delivery, by wealth, education, urban/rural location, across a wide spectrum of countries. A less consistent picture is portrayed of equity in access to ANC, with mixed evidence in the nature and scale of inequities. Very few studies included PNC as an indicator, resulting in a dearth of evidence on equity in access to this service. Evidence regarding equity in use of contraception was mixed, with very few studies including unmet need for family planning as an indicator. Evidence on

equity in unwanted pregnancy was mixed, and overall was included in few studies. There is also a lack of evidence on equity in reproductive and maternal health outcomes, as opposed to service use indicators.

The studies reviewed were rarely able to comment on trends in equity over time, with the majority drawing on data from a single year. Yet studies analysing changes in equity over time can be extremely revealing, as they can relate to changes in policy, whilst what can be learnt from a single snapshot in time is relatively limited. In analysing equity, most studies reviewed here used logistic regression to establish the statistical significance of differences in indicators by socio-economic variables, generally comparing the richest and poorest quintiles. Very few studies use more technical methods for estimating equity in access to services such as concentration curves and indices, which are preferable as they take into account all individuals within the sample, and account for the socio-economic dimension of health, by ranking the sample population by wealth, rather than by health status (Wagstaff, A, Paci, et al., 1991). Finally, in all the studies reviewed here, none assessed equity in access to reproductive and maternal health specifically in Cambodia.

Whilst the methods used in the reviewed studies do not enable causal inference, many reasons were suggested for the presence of the inequities in reproductive and maternal health identified in this review. These varied depending on the social stratification variable by which equity is assessed, and by the outcome being considered. Explanations can be broadly categorised into supply side and demand side factors. Supply side factors included the perpetuation of informal payments within the health system; weak public health insurance; a lack of protection for the poor to meet the costs of healthcare; poor quality of services deterring use; poorer availability of trained providers in rural areas and proximity to services in urban areas; poor road

infrastructure in rural areas inhibiting access to services (Agha, S et al., 2011; Exavery et al., 2014; Målqvist et al., 2013; Muchabaiwa et al., 2012). Demand side factors included better-educated women attaching a higher value to their health, being more aware of the benefits of preventive health services, more confident dealing with service providers and more willing to travel away from home; that more educated women have greater autonomy regarding health decisions and have more confidence and skills to communicate these to husbands and other family members; conversely rural women often marry young, at which point they are forced to curtail their education and the benefits that come with it; cultural differences in the perceptions, beliefs and practices of aspects of maternal and reproductive health; distance to facilities in rural areas and a lack of transport to get there; lack of money in poor households to pay for healthcare, compared to richer households (Agha, S et al., 2011; Exavery et al., 2014; Muchabaiwa et al., 2012; Neupane et al., 2012; Ochako et al., 2011; Singh et al., 2012). The following two literature reviews focus on issues related to overcoming some of these demand side barriers to accessing reproductive and maternal health services for poor and marginalised groups.

2.2 Identifying the poor in low- and middle-income countries

The previous review illustrated that disparities in reproductive and maternal health are prominent in LMICs, typically with poor, rural, uneducated women at more of a disadvantage. In order to overcome some of the barriers these groups face, this thesis in part is concerned with two demand-side financing interventions – vouchers and health equity funds – and whether they have the potential to improve equity in reproductive and maternal health. An integral aspect of such interventions is how these vulnerable groups are identified, in order that they can receive benefits with which to improve their health. This review considers the evidence on identifying and targeting the poor in LMICs in order to inform research conducted for this thesis reported in Chapter 6, which explores targeting the poor in Cambodia. It starts with an overview of the arguments and evidence regarding the debate about whether to target subsidies and benefits to the poor, versus universally removing health service user fees altogether. The evidence regarding the effectiveness of different targeting mechanisms is then reviewed, along with measures and frameworks for such analysis. A specific section is included in this review on evidence related to Cambodia's health equity funds (HEF)s, a health insurance scheme targeted to the poor, which is the focus of study objective 4 of the thesis. Evidence of targeting accuracy of HEFs, as well as their health impact, is reviewed here. The review concludes with a discussion of evidence gaps.

2.2.1 Universal fee removal versus targeted subsidies

The structural adjustment era of the 1980s and 1990s saw low government health expenditure coupled with the introduction of user fees for health services throughout much of the developing world, and, with it, increased out of pocket (OOP) spending and reduced access to healthcare particularly for poor, marginalised and vulnerable

populations (Ensor, Tim et al., 2005; James et al., 2006; Meessen et al., 2006; Palmer et al., 2004). Over time substantial evidence has shown that user fees largely impede access to health services, particularly for marginalised and low-income groups (Ensor, Tim et al., 2005; Gertler et al., 1987; James et al., 2006; Palmer et al., 2004). Subsequent agreement has developed acknowledging the negative impacts of such policies on healthcare utilisation, particularly for the poor. However consensus has not emerged regarding how this should be addressed (Gilson et al., 2005). The debate has at times become polarised, framed at one end by advocates of universal fee removal, and by proponents of targeted subsidies or fee waivers for the poor at the other (Mkandawire, 2005; Thomsen et al., 2011; Yates, 2009).

User fee policies often include exemption and waiver clauses for the poor. However exemptions have typically been issued by health facilities in the absence of any source of reimbursement for any subsidised or free care provided. As such, waivers effectively represent a revenue loss for already under-resourced services. This produces a conflict of interest for facility staff with the responsibility of issuing waivers to the poor (Hanson et al., 2008; Meessen & Criel, 2008). Overall waiver policies have not increased service utilisation by the poor (James et al., 2006; Meessen & Criel, 2008; Ridde, Valéry et al., 2011). Conversely, universal fee removal can substantially reduce administration costs of service provision, and if the majority of the population are poor, may be the most efficient way to target this group (Barros, A et al., 2005; James et al., 2006; Meessen & Criel, 2008; Meessen et al., 2006). Universal fee removal is also likely to be favoured by communities and can garner political support. However, targeting subsidies to the poor through mechanisms such as vouchers, conditional cash transfers, equity funds or subsidised insurance can ensure more accurate distribution of benefits to the most disadvantaged groups and can be efficient if there is a large non-poor population. Targeted subsidies also serve to remind beneficiaries of their

exemption entitlement and can stimulate service uptake. In addition, targeting has been argued to serve as a practical step in a progressive, staggered strategy to achieve universal health coverage (Gwatkin, Davidson R et al., 2011). However, targeting has higher administrative cost than simply removing user fees, which may be unmerited in a setting with a predominantly poor population (Meessen et al., 2006). Although, ultimately this debate is concerned with issues of equity as well as efficiency; if targeting is poorly implemented it could potentially be less equitable than universal fee removal.

As is illustrated in the other reviews in this chapter, and also from experiences of user fee removal, the service cost is not the only barrier to access for individuals, particularly the poor. Other cost and non-cost barriers remain prevalent and can dissuade the poor from accessing even free services (Barros, A et al., 2005; Meessen et al., 2006). Cambodia's health equity fund (HEF) is typically cited as a successful targeting policy where user fees have been retained, but increases in service use by the poor through the HEF have been experienced. Central components of HEF benefits have included subsidies for costs beyond service fees, such as transportation to facilities, food and other expenditures whilst at facilities, for eligible beneficiaries (James et al., 2006; Meessen et al., 2006). In addition, HEFs have been implemented alongside improvements in service quality and increased staff salaries (Meessen et al., 2006). See section 2.2.4 for more detailed evidence regarding HEFs.

Health financing strategies are ultimately highly context-specific. Yet lessons from countries adopting alternative strategies to overcome the challenge of user fees are important and should be considered by policy-makers. A critical aspect of policies targeting subsidies to the poor or other vulnerable populations is the implementation of the targeting mechanism, which is discussed below.

2.2.2 Targeting mechanisms

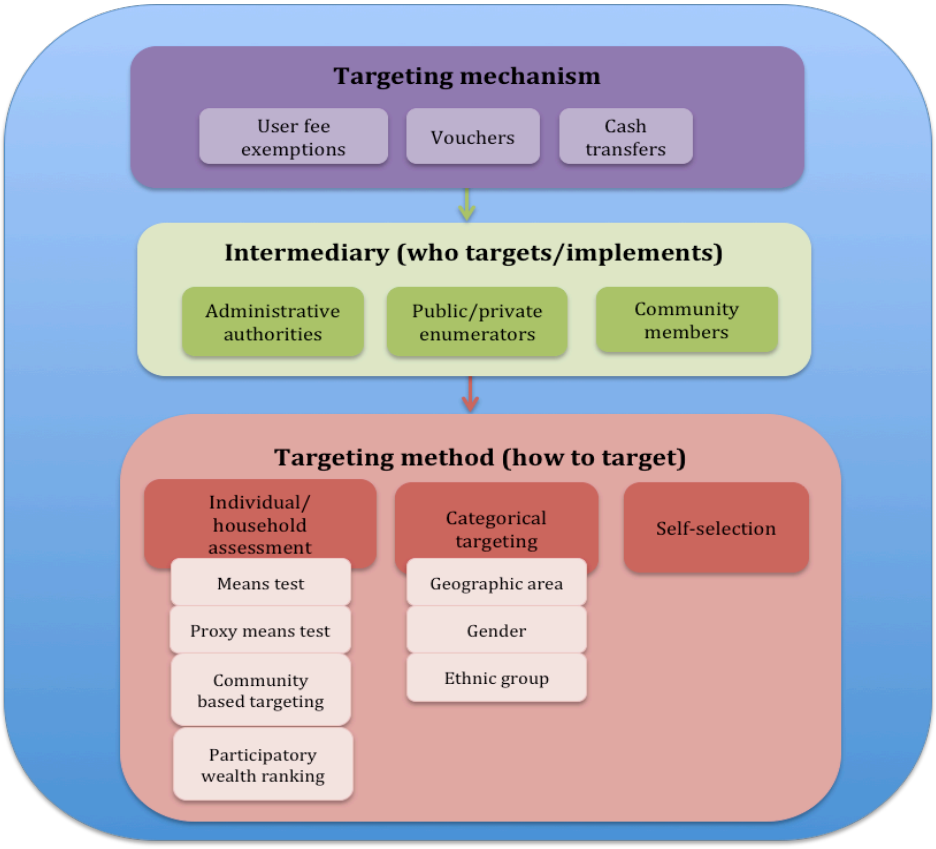


Figure 2.4: Components of poverty targeting strategies

Regarding targeting subsidies, a distinction is evident in the literature between targeting mechanisms, the broader delivery system of targeting benefits, including the organisational design, intermediaries for identifying beneficiaries and channels of benefit delivery; and targeting methods, the specific tools used to identify beneficiaries (see Figure 2.3). User fee exemptions, vouchers and cash transfers are examples of different targeting mechanisms. Types of intermediaries used to identify beneficiaries include local authorities, health workers, or community members. Targeting methods include individual or case-based assessment, typically using a (proxy) means test (PMT) or community-based targeting (CBT); categorical targeting using easily observable characteristics such as geographic area or gender; and self-selection

whereby the benefit is available to all, but designed to be more attractive to the target population, so they opt-in to the scheme (Alatas et al., 2013; Coady et al., 2004; Conning et al., 2002; Hanson et al., 2008).

Means testing (MT) identifies poor households or individuals by assessing income or expenditure. MT is a costly process that is administratively complex, requiring collection of detailed household data on consumption expenditure (Aryeetey et al., 2012; Houssou et al., 2011). PMT identifies poor households using indicators of household socio-economic status such as asset ownership, housing quality, and amenity infrastructure (Aryeetey et al., 2012; Filmer et al., 2001; Vyas et al., 2006). PMT is quicker, easier to implement and less costly than MT (Hargreaves et al., 2007). CBT uses community members as intermediaries to identify beneficiaries and sometimes deliver and monitor benefits (Conning et al., 2002; Hanson et al., 2008). CBT is a cheap targeting strategy, as community members are often not paid; communities may use more nuanced and locally-relevant conceptualisations of poverty to attribute benefits than standardised quantitative metrics; the process may also strengthen social capital within the community (Conning et al., 2002). Participatory wealth ranking (PWR) is a method whereby community representatives rank households based on indicators of socio-economic status developed through group discussion (Houssou et al., 2011). Combinations or hybrids of targeting methods can be used within any single targeting mechanism and are common (Alatas et al., 2010; Hanson et al., 2008).

When evaluating poverty targeting systems, the evidence tends to draw on incidence of exclusion and inclusion errors. Inclusion errors reflect the proportion of benefits going to the non-poor; exclusion errors comprise the proportion of the poor not accessing the benefit (Conning et al., 2002). These are sometimes referred to as leakage and

under-coverage respectively. Implicit in the existence of targeting errors are problems in the system of identification of the poor. These concepts are illustrated in Figure 2.4 below.

	Benefit	**No benefit**
Poor	A	B
Non-poor	C	D

Inclusion error/leakage = C/(A+C)

Exclusion error/under-coverage = B/(A+B)

Figure 2.5: Illustration of inclusion and exclusion errors

Hanson et al (2008) suggest that targeting errors comprise part of a broader conceptual framework for designing and analysing targeting interventions, stating that targeting studies too often only consider accuracy rather than the broader but equally important issues of how or why particular interventions might be accurate or inaccurate (Hanson et al., 2008). They suggest the following five components are critical to consider of any targeting programme: 1) Why target? Considering targeting versus universal provision of services; 2) What is being targeted? Defining the benefit; 3) Who to target?; 4) How to target – targeting methods and mechanisms; 5) Criteria for evaluation – leakage, coverage, cost, political feasibility and sustainability (Hanson et al., 2008)(Alatas et al., 2010).

2.2.3 Evidence of effectiveness of targeting mechanisms

Some research has focused on the relative performance of individual versus categorical targeting methods. Simulating outcomes for Uganda, it was found that targeting family planning interventions by geographic methods (to all women in the poorest districts) had a greater impact on reducing poverty incidence than allocating benefits only to the poorest households through individual assessment (Kraybill et al., 2006). Similarly in Ghana, in areas of high poverty incidence geographic targeting was found to be preferential, partly as the costs of including some non-poor houses in poorer areas were less than the costs of implementing MT, PMT or PWR methods. In areas of low poverty incidence, PMT was recommended as the most cost-efficient method to target benefits to the poor (Aryeetey et al., 2012). Across 13 Latin American countries, individually targeting social benefits reduced poverty more than categorical distribution, however, as in Ghana, in areas of widespread poverty incidence, categorical or geographic targeting was also found to be a valid option (Coady et al., 2004).

Comparing individual assessment methods of PMT and CBT in a randomised control trial in Indonesia, Alatas et al (2010) found that whilst targeting errors are fewer with PMT, CBT identifies more of the extreme poor and has more legitimacy within communities. Lower accuracy in the CBT arm was attributed to fatigue amongst community members as the selection process took several hours (Alatas et al., 2010). Similar evidence was found in Burkina Faso where CBT was perceived to be acceptable by a variety of stakeholders, despite a low selection rate of eligible households, with only 17% of the total financial capacity of health centres for exemptions allocated to beneficiaries, representing substantial under-selection of eligible households. However CBT was found to select more of the extreme poor and socially vulnerable households than other methods utilising PMT or selection by health facility staff (Ridde, V, Haddad, et al., 2010; Ridde, V, Yaogo, et al., 2010). CBT can benefit from lower administration costs, better information for identifying the poor, less

opportunity to provide false information and use of a local definition of deprivation. However, CBT may be subject to increased conflict within the community, and high opportunity costs for community leaders (Coady et al., 2004; Conning et al., 2002). A hybrid model is thought to help reduce the potential risk of local elite capture of CBT (Alatas, 2010). In Malawi, a history of using CBT methods to distribute agricultural subsidies to the poor has been associated with high inclusion and exclusion errors (Houssou et al., 2011). Assessing the respective benefits of PMT and CBT methods for targeting, Houssou and Zeller (2011) found that PMT was potentially more target-, cost- and impact-efficient than CBT, although this was assuming flawless implementation of targeting, which is highly unrealistic.

Cambodia's national poverty identification programme, the ID Poor, combines PMT with CBT to identify poor households. Research on the accuracy of the ID Poor has produced varying results. Ir et al (2008) found inclusion errors of between 26.3-43.4% and exclusion errors of between 43.8-46.6% (Ir et al., 2008). An as yet unpublished study by the World Bank found 29.5% of very poor and poor households were excluded from the ID Poor (calculated using the ID Poor tool), and 13.5% of non-poor households were included. In addition, the study assessed accuracy of the ID Poor against consumption-based quintiles, the gold standard measure of poverty. Using a consumption-based poverty measurement they found 51% of the poorest quintile was excluded from the ID Poor, whilst 15% of the wealthiest quintile was erroneously included (World Bank, 2012a). This outcome may result in part from the fact that the ID Poor tool, based on asset ownership, is a weak proxy for consumption poverty.

Conning and Kevane (2002) suggest that hybrid approaches to targeting are likely to achieve the best outcomes, as they balance community involvement with rules and

guidelines for conduct in identifying the poor. Coady et al (2004) in a review of 85 targeting interventions, report that use of multiple targeting methods improves targeting performance, with each additional method associated with a 15% improvement in targeting (Coady et al., 2004).

The success of any targeting approach is dependent on the context in which it is conducted and the nuances of its implementation. In selecting appropriate targeting strategies, it is important to consider poverty incidence across the country or focal area, and the extent of the poverty gap between rich and poor. How poor and non-poor populations are defined (i.e. using absolute or relative thresholds) can also impact the effectiveness of different targeting approaches, depending on the context (Acosta et al., 2011).

2.2.4 Cambodia's Health Equity Funds

Cambodia's Health Equity Funds (HEFs) are reviewed specifically in this section, as they are the focus of study objective 4 of the thesis. As such the evidence reviewed here not only considers the targeting accuracy of the HEFs, but also the wider evidence of their health impact. HEFs are not included in the final review of this chapter (section 2.3), which focuses on two types of demand side financing interventions for reproductive and maternal health in LMICs, as HEFs provide access to a comprehensive package of health services for poor households, they are not specifically for reproductive and maternal health.

Targeting accuracy of HEFs

The HEFs employ a unique targeting mechanism to overcome the perverse incentives of more traditional fee waiver initiatives. HEFs target beneficiaries using either pre-

identification or post/passive-identification. The former, conducted through the national ID Poor system, involves an element of CBT plus individual assessment of household poverty status using a PMT. Pre-identified households typically are issued with a card indicating their eligibility for HEF support to be used for all subsequent health care needs. Post-identification is conducted at the health facility and is valid for a single illness episode (Noirhomme et al., 2007). Ministry of Health national guidelines stipulate that HEFs should encompass no more than 2% leakage of benefits, and 3% under-coverage (MOH, 2005). The evidence to date suggests that these targets are not being met. Overall, under-coverage has been found to be more of a problem than leakage. Amongst in-patients in six rural district hospitals in Cambodia, HEF support was accessed predominantly by poor or very poor patients, with a reported leakage rate of 6.5% (Meessen, Chheng, et al., 2008). Evidence of under-coverage was greater, with not all poor or very poor patients covered by the HEF (Meessen, Chheng, et al., 2008)(Men et al., 2008). Indeed, this only captures targeting errors amongst poor patients who reached a hospital; under-coverage is likely to be higher in the wider community, when taking into account poor individuals in need of care who did not manage to access services (Hardeman et al., 2004).

A comparative study in Kirivong district found that pre-identification was preferable amongst beneficiaries to passive identification (Jacobs et al., 2008). Qualitative data on leakage of HEF benefits is hard to gather as some households fear disclosing information about richer families using HEFs (Men et al., 2008). Whilst under-coverage was found in qualitative studies to be more pervasive than leakage across six districts, this could potentially be because of the former issue (Men et al., 2008). Explanations given for under-coverage of the HEF included families not being at home when the identification team conducted their survey; village chiefs excluding some families from the poor household lists provided to identification teams; isolated

households not being reached by identification teams; identification teams excluding some households based on the size of the house and whether it was perceived from the outside to be rich or poor (Men et al., 2008). Reasons given for leakage of HEF benefits included better-off families pretending to be poor; village chiefs recommending households for interview who support their political party; possibly some household moving out of poverty but retaining their HEF card (Men et al., 2008). Despite acknowledgement of the presence of targeting errors, studies have found the majority of service users (beneficiaries and non-beneficiaries of the HEF) to perceive the targeting process as fair (Annear, PL et al., 2008; Men et al., 2008). However these studies did not include a substantial, if any, sample of excluded poor households as data were typically gathered from hospital patients.

Impact of HEFs

There is limited literature on the impact of HEFs, particularly on health outcomes, whilst the methodological rigour of studies examining the HEFs varies considerably. Flores et al (2013) conducted the only national level impact analysis of HEFs to date, using time and geographical variation in HEF operation to conduct a difference-in-differences analysis. Their study found that between 2004 and 2009 HEFs significantly reduced average household health payments per care episode (amongst those who make a health payment) by 8915 Riel (US$2), a 42% relative reduction, for poor households. HEFs were found to reduce out of pocket (OOP) payments to public providers by 23,852 Riel (US$6), or 57%, for households who usually seek care from a public provider, and by 4757 Riel (US$1.2), or 37%, for households who usual seek care from pharmacists and drug vendors. HEFs significantly reduced the probability of seeking care in a private facility, however no other significant effects of HEFs were reported on healthcare utilisation.

Conversely, several district-level case studies provide descriptive analysis of increased utilisation of hospital services in HEF areas since implementation of the programme, of increased institutional deliveries and use of other maternal health services in districts with HEFs (Jacobs et al., 2008; Men et al., 2008). However, the methods used within these studies were not sufficiently robust to infer that increases in service utilisation directly resulted from the HEFs. To the best of our knowledge there is no substantive evidence of the impact of HEFs on objective health outcomes.

2.2.5 Evidence gaps

It is acknowledged that many studies assessing targeting mechanisms fail to consider a wider analysis framework beyond the accuracy of the mechanism. It is recommended that future studies incorporate analysis of how and why a mechanism is or isn't accurate, as well as consideration of issues such as cost, feasibility and sustainability (Hanson et al., 2008). There is some consensus that in areas of widespread poverty, using a categorical method of targeting social benefits such as geographic targeting is likely to produce fewer targeting errors and be more cost-efficient, whilst in the context of lower poverty incidence use of individual targeting methods are more suitable. The evidence regarding which of the available individual targeting methods produces the best results is mixed and very much dependent on context and implementation. Further evidence on experiences and assessments of targeting methods is necessary to develop more detailed insight into the most suitable and efficient approaches for different contexts.

Whilst several studies of the Cambodian HEF have assessed accuracy, their sampling frame is typically from amongst hospital patients only; more accurate estimates of targeting errors within the HEF necessitate the utilisation of population-based surveys

to capture individuals not seeking care at a facility (Annear, PL et al., 2008; Jacobs et al., 2008). The majority of studies of the Cambodian HEF also only consider its accuracy; *reasons* for under-coverage and leakage within the HEF need to be further explored (Jacobs et al., 2008; Men et al., 2008). Furthermore, rigorous impact evaluation of HEFs is extremely limited with no studies to date assessing the impact of HEFs on reproductive and maternal health service use, or objective health outcomes. Utilisation of a more comprehensive analysis framework in assessing targeting strategies will better contribute to the broader debate regarding whether to target subsidies or remove user fees altogether, by providing greater contextual information on how and why certain interventions succeed or fail.

2.3 Targeted demand-side financing for reproductive and maternal health services in low- and middle-income countries

The final review in this chapter considers evidence relating to two demand-side financing interventions, targeted to poor and vulnerable households. This review builds on the evidence discussed in 2.2 above, as these interventions incorporate a mechanism to enable benefits to be targeted to beneficiaries. The quality of implementation and performance of those targeting mechanisms will in part affect the overall outcomes of the interventions.

Amid critiques of the health sector being too supply-driven, the 'demand side' has gained prominence within the policy arena in the last decade (Ensor, T et al., 2004; Standing, 2004). The demand side determinants of health are "*those factors that influence demand and operate at the individual, household or community level*" (Ensor, T et al., 2004). It is acknowledged that such determinants can manifest as multiple barriers to service utilisation including education and information barriers; consumer cost barriers; household and community barriers (Ensor, T et al., 2004; O'Donnell, Owen, 2007). These barriers disproportionately affect the poor, resulting in under-utilisation of services amongst those arguably most in need (Ensor, T et al., 2004; O'Donnell, Owen, 2007; Prata et al., 2009). Of these demand side barriers, financial barriers are a major component, including user fees, transport costs in accessing services and opportunity costs of seeking healthcare. Such financial demand side barriers are acknowledged as a key reason for slow progress in reducing maternal deaths worldwide (Prata et al., 2009). Demand side financing (DSF) interventions are being increasingly employed in developing countries to overcome demand side financial barriers to health and health services (Bhatia et al., 2007). DSF places "*purchasing power into the hands of consumers…to spend on specific services*" (Ensor, Tim, 2004). DSF mechanisms include vouchers, conditional cash transfers (CCTs), in-

kind transfers, and user fee exemptions. They aim to remove financial barriers to health services for eligible individuals and in some cases enable the user to select a provider of their choice.

It is argued that intervening on the demand side can help overcome healthcare market failures such as asymmetry of information and failures of insurance markets in LMICs, by providing users with information about service availability and safety nets against healthcare costs (Bhatia et al., 2007; Ensor, T et al., 2004; O'Donnell, Owen, 2007). Demand side interventions may also improve equitable access to services, through targeting resources to those most in need (Bhatia et al., 2007; Ensor, T et al., 2004; O'Donnell, Owen, 2007; Watts et al., 2008). DSF is advocated for its potential to target low income, vulnerable or high risk groups; to change behaviour and increase demand for services; for promoting competition between providers and improving quality of services, as for providers to be contracted as part of the intervention, quality criteria must be met. Services typically targeted by DSF include primary prevention services, chronic disease management, maternal and perinatal care, treatment of priority diseases such as malaria and tuberculosis, and service provision for high risk groups such as commercial sex workers (Ensor, Tim, 2004; Watts et al., 2008).

This review assesses evidence from low- and middle-income countries regarding DSF interventions for reproductive and maternal health that are targeted to groups or geographic areas in particular need of improved access to services, focusing specifically on two types of targeted interventions – vouchers and demand-side financial incentives, including conditional cash transfers (CCTs). The review included 23 papers, of which 15 included vouchers, 12 included demand side financial incentives, 6 reviews of multiple studies. Table 2.2 summarises the characteristics of the studies reviewed. The following sections provide an overview of the evidence from the papers reviewed,

organised by intervention, and then by outcome including service utilisation, equity of service use, financial protection, quality of care and health outcomes. Section 2.2.1 reviewing the evidence on vouchers also includes a section on targeting effectiveness. The review then considers the preconditions for successful implementation of these interventions, challenges in implementation, and concludes with a discussion of evidence gaps.

Table 2.3 Summary characteristics of demand side financing intervention studies for reproductive and maternal health in low- and middle- income countries

Country, Author, Year	DSF intervention	Methodology	Outcomes studied
Bangladesh, Ahmed et al, 2011	Vouchers	Equity analysis - comparison of concentration indices for intervention and control areas; logistic regression - estimating outcomes for intervention compared to control areas	3+ ANC visits, SBA, FBD, PNC
Bangladesh, Nguyen et al, 2012	Vouchers	Regression analysis, difference in differences analysis	ANC, SBA, FBD, casearean section, PNC, out-of-pocket payments
Cambodia, Brody et al, 2013	Vouchers	Focus groups, qualitative analysis	Factors affecting use of vouchers
Cambodia, Van de Poel et al 2014	Vouchers	Difference in differences analysis	ANC, FBD, delivery setting,
India, Lim et al, 2010	Cash incentives	Matching, with versus without analysis, difference in differences analysis	ANC, SBA, FBD, perinatal mortality, neonatal mortality, maternal mortality
Kenya, Njuki et al, 2013	Vouchers	Household survey, focus group discussions, descriptive quantitative analysis, qualitative analysis	Awareness of vouchers, use of vouchers, perceptions of vouchers and their use
Kenya, Obare et al, 2014	Vouchers	Regression analysis	FBD, place of delivery
Latin America, Acosta et al, 2011	CCTs	Simulated impacts of CCTs	Poverty rates, poverty gaps, income inequality, cost-effectiveness of targeting
Malawi, Baird et al, 2012	CCTs	Regression analysis	Prevalence of HIV, Prevalence of herpes simplex 2 virus, prevalence of syphillis

Mexico, Darney et al 2013	CCTs	Regression analysis	Incidence of pregnancy, current use of modern contraceptives
Mexico, Sosa-Rubi et al, 2011	CCTs	Regression analysis	ANC, SBA
Multi-country, Bellows et al, 2010	Vouchers	Systematic review	Targeting, costs, service utilisation, quality of care, health impacts
Multi-country, Glassman et al, 2013	CCTs	Systematic review	ANC, SBA, tetanus toxoid for mothers, hospital delivery, contraceptives, casearean section, low birthweight
Multi-country, Jehan et al, 2012	Vouchers and CCTs	Literature review	Service utilisation, equity of access to services, quality of care, intervention implementation
Multi-country, Morgan et al, 2013	Financial incentives	Literature review	Intervention implementation, quality of care
Multi-country, Murry et al 2014	Vouchers, CCTs, cash incentives	Systematic review	SBA, maternal mortality, maternal morbidity, neonatal mortality, neonatal morbidity, perinatal mortality, perinatal morbidity, infant mortality, infant morbidity, intervention implementation
Multi-country, Witter and Somanathan, 2012	Vouchers, CCTs, long term income support	Literature review	Service utilisation, equity of access to services, financial protection, quality of care, health outcomes, cost effectiveness
Nepal, Powell-Jackson et al, 2012	Cash incentives	Propensity score matching	SBA, FBD, casearean section, delivery setting
Nepal, Powell-Jackson et al, 2009	Cash incentives	Key informant interviews, focus group discussions, qualitative analysis	Intervention implementation
Nicaragua, Borghi et al, 2005	Vouchers	Cost-effectiveness analysis	Treatment for STIs
Nicaragua, Meuwissen et al, 2006	Vouchers	Regression analysis	Use of sexual and reproductive healthcare within last 15 months , modern contraceptives, Condom use during last sexual contact
Pakistan, Agha, 2011	Vouchers	Regression analysis	ANC, FBD, PNC, family planning
Pakistan, Azmat et al 2013	Vouchers plus social franchise	Quasi-experimental study, difference-in-differences analysis	Ever use of contraception, current use of contraceptive methods

2.3.1 Vouchers

Service utilisation

Systematic reviews have found positive, consistent evidence of the impact of vouchers on utilisation of reproductive and maternal health services (Bellows, Nicole M et al., 2010; Meyer et al., 2011; Murray et al., 2014; Witter et al., 2012). Several studies have found vouchers to be associated with increased use of maternal health services. For example in Cambodia, vouchers were significantly associated with a 16 percentage point increase in probability of a facility based delivery compared to those in non-voucher areas. Specifically in areas with universally distributed vouchers, use of at least three ANC visits was 10 percentage points higher amongst poor women and 5 percentage points higher amongst all women. Interestingly in areas with vouchers targeted only to poor women, no significant impact on use of ANC was found (Poel et al., 2014). Similar results have been reported in Kenya and Bangladesh (Ahmed et al., 2011; Nguyen et al., 2012; Obare et al., 2014).

In Nicaragua vouchers were associated with increased use of sexual and reproductive health services and of modern contraception by adolescents (Meuwissen et al., 2006), and were found to be cost-effective, compared to standard provision of care (Borghi et al., 2005). Vouchers for STI services in Uganda were associated with a 15% increase in service use, although skewed towards those living within 10km of health facilities (Witter et al., 2012). Vouchers in Pakistan for contraceptive services (implemented alongside a social franchising programme) were found to significantly increase use of modern contraceptives by 28%, to increase the contraceptive prevalence ratio by almost 20%, to reduce the use of traditional methods by 3%, and to reduce unmet need for contraception by almost 8% (Azmat et al., 2013). However, in the latter study it

was not possible to determine the individual effects of the voucher versus the social franchising activities.

Equity of service use

Most studies do not analyse differences in voucher outcomes by socio-economic groups. Of those that did, in Pakistan vouchers were found to significantly reduce the differences in facility-based deliveries between the poorest 40% of the sample population, and the richest 20% by 1.4 times more in intervention areas compared to controls over the study period of a year. A similar but less powerful effect was also found for differences in use of ANC and PNC. No equity effect of the vouchers was found on use of FP services. The latter outcome could be due to the existence of strong cultural and social barriers affecting use of FP services, whilst the voucher was only designed to tackle financial barriers to service use (Agha, Sohail, 2011). In Bangladesh, using concentration indices it was calculated that use of maternal health services was more equitable in intervention compared to control areas (Ahmed et al., 2011). However it has also been reported of this programme that 49% of women in the wealthiest two quintiles have benefited from the vouchers, even in areas where they were targeted to the poor (Witter et al., 2012). In Cambodia vouchers increased the likelihood of facility-based delivery by 10 percentage points (pp) for all pregnant women, and by 16pp for the poorest 40% of the sample (Poel et al., 2014)

Financial protection

Few studies report on the impact of interventions on financial protection for beneficiary households (Witter et al., 2012). In Bangladesh women delivering in voucher areas reported lower OOP spending than women in control areas (Bellows, Nicole M et al., 2010), although that OOP expenditure persists for beneficiaries,

indicates that financial barriers have not been eliminated by vouchers (Nguyen et al., 2012). In Kenya the majority of voucher users stated they would recommend the vouchers to a friend as they provide cheap or more affordable services, they help to offset medical bills and they protect women from detention in facilities if they are unable to pay service fees (Njuki et al., 2013).

Targeting effectiveness

Modest evidence has been found that health vouchers effectively target populations (Meyer et al., 2011), although the majority of studies from which this conclusion was drawn were not of reproductive and maternal health vouchers. In Cambodia both targeted and universal vouchers have been found to have a positive impact on use of maternal health services, however universal vouchers (provided to all pregnant women regardless of socio-economic status) increased facility-based deliveries amongst the poorest 40% of the sample *more* (18pp) than vouchers targeted only to the poor (11pp). Similarly whilst universal vouchers significantly increased use of at least three ANC visits by 5pp for all pregnant women and by 10pp amongst the poor, vouchers targeted to the poor were not significantly associated with increased use of ANC. The differences in outcomes between targeted and universal vouchers could be due to different incentive structures used by the schemes respectively such as the packages of services provided with vouchers and how providers were reimbursed (Poel et al., 2014). Alternatively, it could be the result of poor households being more prepared to use a voucher that is given to all households, and which they may hear of wealthier women also using, rather than something that identifies them as poor.

In Cambodia and Kenya, qualitative research has reported concerns from voucher users, and intended beneficiaries regarding the accuracy of the poverty targeting tools

that are used to assess eligibility for the vouchers, with anecdotal reports of inclusion and exclusion errors in targeting (Brody et al., 2013; Njuki et al., 2013). Overall there is very little evidence on this issue in the literature.

Quality of care

Several factors can conspire against poor healthcare users in LMICs that result in the receipt of poor quality care, compared to that provided to non-poor and wealthier service users. These include stigma and discrimination towards the poor; less financial return from poorer service users for health providers, for example in tips; lack of awareness of poorer and less educated service users about what standards of care to expect or request; fear of recrimination amongst poor service users of making a complaint about poor quality care; or lack of any system to receive with and act upon complaints about service quality. Qualitative research in Kenya found that women reported receiving better or more prompt service when using a voucher compared to without, and that the vouchers protected women from abandonment by staff, a potential outcome if found unable to pay service fees. However in one particular district there were reports of discriminatory treatment by facility staff towards voucher users (Njuki et al., 2013). Similarly in Cambodia there have been some reports of poor treatment from facility staff on presenting a voucher or card identifying themselves as poor (Brody et al., 2013). In the Nicaragua STI voucher programme, 'simulated patients' were used to assess quality of care, and some improvement in service quality was demonstrated since the start of the intervention (Borghi et al., 2005).

Health outcomes

There is limited evidence on the effect of vouchers for reproductive and maternal health on health outcomes. Whilst some studies of vouchers for STI treatment report a reduction in prevalence rates of STIs, for example in Nicaragua and Uganda (Bellows, Nicole M et al., 2010), one review of voucher programmes for a range of health services found no evidence of effect of vouchers on health outcomes (Meyer et al., 2011). Murray et al (2014) report no effect of vouchers found on maternal or neonatal mortality, compared to control areas.

2.3.2 Demand-side cash incentives

Service utilisation

There is growing evidence in the literature of a positive effect of demand-side cash incentives on use of reproductive and maternal health services, particularly for use of ANC, SBA and FBD. No evidence was reported of a positive effect of incentives on use of PNC. For example, women in the Safe Delivery Incentive Programme (SDIP - now called *Aama*) in Nepal were 26% significantly more likely to use government health institutions for delivery and 17% more likely to use an SBA (Powell-Jackson et al., 2012). A review of 12 studies of CCTs in eight countries found consistent evidence of a positive effect of CCTs on ANC use, even for programmes that didn't include a conditionality relating to ANC use (Glassman et al., 2013). Glassman et al (2013) also report consistent evidence of the positive effect of CCTs on use of SBA, with an overall effect of a 12pp difference in SBA use between populations with and without exposure to a CCT. A consistently positive effect of CCTs was reported for use of facility-based delivery, with the effect size ranging from 4pp in Nepal to 44pp in India for populations with a CCT compared to those without (Glassman et al., 2013). Similar results have been reported for the Janani Suraksha Yojana (JSY) programme in India, and for CCTs in Honduras (Lim et al., 2010; Morris, Saul S et al., 2004). Two studies of CCTs in

Honduras and El Salvador were found to have no impact on utilization of postnatal services (Glassman et al., 2013; Morris, Saul S et al., 2004).

Mixed evidence has been found of the effect of the Opportunidades CCT programme in Mexico on contraceptive use, with some studies reporting a significant difference in service use between CCT and control populations, and others reporting no effect (Darney et al., 2013; Feldman et al., 2009; Glassman et al., 2013). Length of exposure to the Opportunidades CCT has been found to produce a 'learning effect' on service use in Mexico, with women with greater exposure twice as likely to have more ANC visits than those with less exposure, and three times as likely to use an SBA during delivery. This effect was found to be robust to stratification of the sample by age (Sosa-Rubí et al., 2011). Recipients of monetary incentives in rural Malawi were twice as likely to seek HIV test results, compared to those without incentives (Thornton, 2008).

Equity of service use

There is limited evidence of the impact of targeted CCTs on equity of service use. Mexico's Opportunidades was found to have the greatest impact on contraceptive use amongst adolescents and the poorest of the poor (Lamadrid-Figueroa et al., 2010). Conversely, women in the middle wealth quintile were found most likely to benefit from JSY in India (Lim et al., 2010), and from SDIP in Nepal, although in the latter programme benefits were not specifically targeted to the poor (Witter et al., 2012).

Financial protection

An evaluation of SDIP in Nepal concludes that cash incentives have protected a small proportion of households from catastrophic expenditure, but the intervention fails to protect households from being forced into poverty resulting from delivery care

payments, for example as the cash transfer covers only a small proportion of total OOP on institutional delivery care (Witter et al., 2012). Similarly in India, JSY covers less than half of OOP expenditure for women, and approximately a third of eligible women reported not receiving their incentive payment (Lim et al., 2010).

Health outcomes

There is limited evidence in the literature on the effect of demand-side incentives on health outcomes. In Malawi, a CCT intervention based on school attendance found a significantly lower prevalence of HIV and prevalence of the herpes simplex virus (HSV-2) in intervention areas compared to controls, whilst participants in intervention areas were significantly less likely to have had sex in the week preceding the survey, and to have a sexual partner of 25 years or older. Interestingly, there was no significant difference in the outcomes found for groups receiving a cash transfer conditional on school attendance, versus those receiving an unconditional transfer, although the study was not powered to detect these differences. Furthermore, the effect observed did not vary significantly based on the amount of cash transferred (Baird et al., 2012).

There is some evidence that CCTs have a significant effect increasing average birth weight and reducing infant mortality (Glassman et al., 2013; Murray et al., 2014). However, there is little evidence of the effect of incentives on neonatal mortality, and of the effect of CCTs on maternal mortality, largely as study sample sizes are typically not big enough to detect changes in such outcomes (Lim et al., 2010; Murray et al., 2014; Powell-Jackson et al., 2012). In Mexico, Opportunidades was significantly associated with an 11% decrease in maternal mortality in programme areas, whilst in India, JSY was associated with significant reductions in perinatal and neonatal mortality, but its

evaluation was not powered to detect an impact on maternal mortality (Glassman et al., 2013; Lim et al., 2010; Witter et al., 2012).

2.3.4 Preconditions for success

It is possible to draw together from the papers reviewed several factors which have been found to be preconditions for the success of interventions. A study from the early stages of voucher implementation in Cambodia found that having pre-existing knowledge of the benefits of using services, familiarity with health facilities, and autonomy in decision-making regarding use of services were important factors in ensuring positive attitudes towards vouchers from intended beneficiaries. The reduced costs of services and transport to facilities were considered attractive components of the vouchers by beneficiaries (Brody et al., 2013).

DSF interventions are reported to be most appropriate where services are underutilised by target groups predominantly due to financial reasons. If other non-financial barriers are highly influential over health seeking behaviour, additional or complementary strategies to address these will be important. Reproductive health in particular is an area where social and cultural factors are influential in decision-making regarding healthcare (Witter et al., 2012). For example, the Pakistan maternal health voucher was accompanied by communication activities, meetings with beneficiaries, and distribution of messages and experiences from women who had used the services already. Three to four visits were required to each household to build trust, allay fears and sell the voucher (Witter et al., 2012).

Service availability and quality are also factors that can influence the success of a demand-side intervention. Services that are inaccessible, or widely perceived to be of

poor quality will not be appealing to beneficiaries to use, even if they are free or receive incentives to do so. These are examples of non-financial barriers that influence health seeking behaviour. In Nepal, the effects of the SDIP incentive were found to be significantly greater in areas where facilities were of better quality (Powell-Jackson et al., 2012).

2.3.5 Challenges in implementation

There was much evidence in the papers reviewed, particularly those that had explored interventions using qualitative methods, about the challenges related to implementing vouchers and demand-side incentives. In several countries confusion and lack of knowledge or information regarding how the interventions (both vouchers and financial incentives) worked and what services could be redeemed with them have been reported by providers and beneficiaries, which have impeded their implementation (Brody et al., 2013; Njuki et al., 2013; Powell-Jackson et al., 2009). Negative attitudes towards vouchers, specifically for FP services, were noted in both Kenya and Cambodia amongst husbands and males within the households, with a detrimental effect on voucher use (Brody et al., 2013; Njuki et al., 2013). Fears and erroneous beliefs about the services promoted through interventions, for example that they result in pressure to undergo a caesarean section during delivery, and/or an HIV test, fear of experiencing side effects from using long-term methods of contraception, fear of additional unofficial payments demanded by facility staff, were reported to inhibit uptake of vouchers and demand-side incentives (Brody et al., 2013; Murray et al., 2014; Njuki et al., 2013). Women in Cambodia who had only recently received their vouchers cited several other concerns that might negatively influence their use of vouchers such as a preference for continued use of traditional birth attendants over skilled birth attendants and facility-based deliveries, and not being able to use the vouchers at their preferred (private) clinics (Brody et al., 2013).

Poor road infrastructure and high transport costs in remote areas of Kenya made accessing voucher-accredited services challenging; in some areas transport costs were significantly greater to reach an accredited provider compared to paying OOP for a closer non-accredited provider (Njuki et al., 2013). As stated above, DSF schemes do not resolve barriers of, for example, geographic remoteness or poor transport links to services, and in the absence of additional interventions to overcome these important persistent barriers, the success of DSF interventions can be compromised (Murray et al., 2014; Witter et al., 2012). The opportunity cost related to women foregoing their household responsibilities in order to seek-out services promoted through DSF interventions can also deter service use (Murray et al., 2014).

An implicit assumption within DSF interventions is that the health system will be able to meet the increased demand from clients created through their activities. However there is evidence from several programmes that in the absence of commensurate supply side support, increased demand for services places considerable strain on facilities (Jehan et al., 2012; Murray et al., 2014). The introduction of DSF should include an assessment of existing health services, and the potential for supply side investment to raise standards and capacity, prior to stimulating increased demand for services (Witter et al., 2012).

Several evaluations commented on the limited institutional capacity of programme implementers resulting in delays in distributing funds to providers and beneficiaries, inefficiencies in the management of interventions, poor monitoring, and the creation of opportunities for fraudulent activity or misuse of funds (Jehan et al., 2012; Murray et al., 2014; Witter et al., 2012).

2.3.6 Discussion and evidence gaps

Few of the studies reviewed here report on the equity impacts of DSF interventions (Morgan et al., 2013; Murray et al., 2014), or the effectiveness of targeting beneficiaries (Witter et al., 2012). Similarly the review illustrates that there is a lack of evidence of the impact of DSF on financial protection of beneficiaries and health outcomes (Witter et al., 2012). Specifically for voucher interventions there is limited evidence of the impact on health outcomes, which presents a mixed picture of their effect. There is a critical need for more evidence regarding the cost-effectiveness of DSF interventions (Glassman et al., 2013; Kelly et al., 2007; Murray et al., 2014; Witter et al., 2012).

Overall the quality of studies included in this review was acceptable. Quantitative studies had all used at a minimum regression analysis to estimate the associations between vouchers and outcomes. Some used more sophisticated methods such as difference in differences, propensity score matching and cost-effectiveness, although these were in the minority. The methods used by these studies overall tend to support the conclusions they draw regarding vouchers and demand-side financial incentives for reproductive and maternal health. However, future studies on these types of mechanisms should attempt to incorporate robust methods more specialised to impact evaluation, such as difference in differences or propensity score matching, than those that have typically been used to date, to enable the specific effect of the intervention to be estimated and from which causal inference can be confidently drawn.

Finally, further evidence and insight is needed regarding the implementation of DSF interventions for reproductive and maternal health, in order to understand how and

why certain mechanisms are successful or present challenges in differing contexts. This would be extremely valuable for future policy-making and planning of health financing in developing countries.

CHAPTER 3 STUDY SETTING - CAMBODIA

This chapter discusses the setting within which this PhD takes place, Cambodia. Section 3.1 provides an overview of Cambodia's socio-economic and political situation; section 3.2 then outlines Cambodia's health system, including an overview of the country's recent history and how this has affected its health system. As the focus of this thesis, and specifically Objective 1, is equity in reproductive and maternal health in Cambodia, section 3.3 discuses health equity within the country's current health policy, and section 3.4 outlines the current situation in terms of reproductive and maternal health in Cambodia. Objectives 3 and 4 of the thesis are concerned with demand side financing in Cambodia, and so section 3.5 details Cambodia's health financing system, including health equity funds and vouchers for reproductive health services. Objective 2 of the thesis focuses on the ID Poor system, Cambodia's poverty identification mechanism that is integral to both the HEFs and vouchers; this programme is described in section 3.6. Finally, study objectives 2 and 3 comprise the qualitative component of the thesis, for which the focal study province was Kampong Thom; section 3.7 provides an overview of Kampong Thom.

3.1 Socio-economic and political situation

The Kingdom of Cambodia in South East Asia borders Thailand, Laos and Vietnam, with a coastline along the Gulf of Thailand. Cambodia has a rich cultural heritage dating back to the ancient Angkorian civilisation of the 9th century. However the country is more infamous for the tragic fate it suffered under the autocracy of the Khmer Rouge (1975-1979). The Khmer Rouge took control of Cambodia in 1975 following a five-year civil war between guerilla forces and the government of the then Khmer Republic

under general Lon Nol. Under the leadership of Pol Pot the Khmer Rouge attempted to establish Democratic Kampuchea as an agricultural communist state, sealing the country from foreign influences, imports and communication, evacuating all urban residents to the countryside, relocating the entire population into forced labour camps to produce food for the nation. Famine swept the country and approximately 2 million people (a quarter of the population at the time) died through starvation, execution and overwork in what is now acknowledged as a mass genocide (Brinkley, 2011; Grundy et al., 2009).

Figure 3.1: Map of Cambodia

A dramatic social and political transition has taken place in Cambodia since the extremes of the Khmer Rouge, through the Vietnamese occupation under the People's Republic of Kampuchea (1979-89), and the State of Cambodia (1989-93), to the establishment of the Royal Government of Cambodia in 1993, which remains in power today. This period has seen Cambodia change from an agrarian to an open, free-market economy and with this has come a steady shift towards decentralization, privatization and private financing of healthcare (Grundy et al., 2009). Twenty-first century Cambodia is attempting to move on from its dark recent history and the current multi-party democracy is increasingly prioritising social issues and the poor (Jonsson, 2008). Despite this, today Cambodia is one of the poorest countries in South East Asia (World Bank, 2014a). 80% of its nearly 15 million population is rural (National Institute of Statistics, 2008), and in 2011 an estimated 20.5% of the population were below the consumption-based national poverty line (World Bank, 2013a). However, this represents a remarkable decline in poverty over the last decade, from a poverty headcount index of 53.2% in 2004 (World Bank, 2013a).

Cambodia has achieved its poverty reduction to date as a result of impressive economic growth since the early 2000s, largely due to expanding construction, textile and tourism industries, one consequence of which has been a nearly 40% increase in household consumption. Current GDP per capita is US$945.50 (World Bank, 2014b), and it is hypothesised that Cambodia could reach a per capita Gross National Income (GNI) by 2015 sufficient to shift it to middle income country status (World Bank, 2013a). Critical to its successful poverty reduction, Cambodia's economic development has benefitted the poor as well as the non-poor. However, the majority of those who have moved out of poverty now exist as the 'near poor', only just above the poverty line and remain extremely vulnerable to even the smallest economic shock (World Bank,

2013a). A loss in consumption of just 1192 Riel (US$0.30) per day would have doubled the poverty rate, from 20.5% to 41.0% in 2011 (World Bank, 2013a).

Early economic development in Cambodia ushered in an increase in income inequality; Cambodia's Gini index grew from 0.38 in 1994, to 0.44 in 2007. However it dropped back to 0.38 in 2008 (World Bank, 2012c), and continued to reduce to 0.28 in 2011 (World Bank, 2013a). Rising income inequality was experienced across East and South East Asia during the early to mid-2000s. This is thought to be due to multiple factors related to uneven economic growth within sub-national regions, and sectors, for example with wealthier, more educated households experiencing more rapid income growth than their poorer counterparts in the province (Asian Development Bank, 2007). Cambodia's Gini index of 0.44 in 2007 was predominantly explained by increases in income inequality *within* regions (e.g. within urban and within rural areas), particularly due to increasing inequality within *rural* areas (World Bank, 2009). The reduction in income inequality since 2008 has been attributed to increasing consumption amongst the poorest quintiles between 2008 and 2011, with a concomitant decrease in consumption amongst the richest quintiles between 2009 and 2011 (World Bank, 2013a). The reduction in income inequality was experienced within both urban and rural areas respectively, however the extent of income inequality *between* urban and rural areas remained the same in 2011 as it was in 2004 (World Bank, 2013a).

90% of the Cambodian population are ethnic Khmer, with the remainder a mix of Chinese, Vietnamese, and Cham-Malay (Jonsson, 2008). Cambodia's human development index ranks at 124 out of 169 countries (United Nations Development Programme, 2010). Due to the atrocities Cambodia suffered throughout the 1970s the

country now has a very young population, with 45% under the age of 20 (NIPH et al., 2010). In 2011 approximately 55% of males and 30% of females had completed primary education, and 15% and 7% respectively had completed secondary education (World Bank, 2013a). The total adult literacy rate in 2012 was 84.9% (UNICEF, 2013).

Table 3.1: Health and development indicators, Cambodia

Indicator	Value
Life expectancy at birth (2010) (years)	71
Infant mortality rate per 1000 live births (2010)	45
Under 5 mortality rate per 1000 live births (2010)	54
Total fertility rate (2012)	2.9
Maternal mortality rate per 100,000 live births (2010)	206
Pregnant women with 4+ antenatal care visits by skilled provider (2010)	57.3%
Births assisted by skilled provider (2010)	68.8%
Women using any modern method of contraception (2010)	21.7%
Married women using any modern method of contraception (2010)	34.9%
Married women using any method of contraception (contraceptive prevalence rate) (2010)	50.5%
Unmet need for contraception (2010)	17%
Physicians per 10,000 population (2014)	2.3
Nursing and midwifery personnel per 10,000 population (2014)	7.9
Hospital beds per 10,000 population (2014)	7
Gross National Income per capita US$ (2012)	880
Total health expenditure per capita US$ (2012)	51
Public health expenditure (as % total health expenditure) (2012)	24.7%
OOP health expenditure (as % private health expenditure) (2012)	81.9%

Sources: (NIPH et al., 2010; World Bank, 2014b; World Health Organisation, 2014c)

Cambodia has experienced impressive health improvements in recent years. For example, infant mortality has reduced from a rate of 95 per 1000 live deaths in 2000 to 45 in 2010, and maternal mortality has reduced from 472 per 100,000 live births in 2005 to 206 in 2010 (NIPH et al., 2010). Table 3.1 provides an overview of selected current health and development indicators for Cambodia.

3.2 The health system

Cambodia's health system was already severely weakened by 1975, and by the fall of the Khmer Rouge in 1979, it was on its knees (Ovesen et al., 2010). As part of the regime's aim to produce a classless society, the Khmer Rouge had systematically murdered the majority of the intellectual elite, and anyone with an education, including most health professionals (Brinkley, 2011). Hospitals were closed to all but the highest ranking of the Khmer Rouge leadership and the use of Western medicine abandoned for most of the population, with the state relying instead on a limited, 'bureaucratised' approach to traditional Khmer medicine (Ovesen et al., 2010). Poor quality domestic pharmaceuticals were produced within Democratic Kampuchea, but again, their use was reserved for higher ranking individuals (Ovesen et al., 2010). Less than 50 doctors survived the regime, whilst 431 medical students graduated from the Faculty of Medicine in 1975 (Grundy et al., 2009). Occupying Vietnamese forces overthrew the Khmer Rouge in 1979 and remained in control of the country for ten years, during which time the foundations were laid for establishing a socialist health system. This included a strong focus on providing training for new health personnel (Grundy et al., 2009; World Health Organisation et al., 2012). 1993 saw the first democratic elections in Cambodia, overseen by the United Nations peacekeeping mission. *Chhmob* (Khmer spiritual, social and physical birth assistants), which during the 1970s and 1980s formed the majority of Cambodia's maternal health cadre, were trained in basic bio-

medical midwifery skills in the 1990s by NGOs and aid organizations to become traditional birth attendants (TBAs) (Ovesen et al., 2010). The 1995 Health Coverage Plan aimed to distribute health facilities according to population coverage, with a focus on reconstruction of rural facilities (Grundy et al., 2009). Over the last 20 years the health system has been gradually resurrected.

Today Cambodia's health system, whilst not without its problems, is a vastly strengthened incarnation of the paralysed structure that preceded it 40 years ago. The health system is based around 77 operational districts (ODs), each covering 100,000 – 200,000 people. Within each OD referral hospitals should (in theory) provide a comprehensive package of services, and a network of health centres and posts deliver basic health services to catchments of 10,000 – 12,000 people each. Tertiary health services are provided by six national hospitals based in Phnom Penh (Hardeman et al., 2004; Noirhomme et al., 2007; World Health Organisation et al., 2012). In 2011 there were 90 referral hospitals, across national, provincial and district levels, 1004 health centres and 45 health posts (World Health Organisation et al., 2012). In addition there is a wide and extensively utilised network of private health providers (including drug shops and pharmacies), with a varied spectrum of medical training, and a strong traditional medicine sector, based around the practice of the *kru khmer* (traditional healers) (World Health Organisation et al., 2012). The 'dual practice' of public health staff working at private facilities to supplement poor government salaries is common (Grundy et al., 2009). The Ministry of Health (MOH) has overall responsibility for the health system, whilst provincial health departments (PHDs) form the link between the Ministry of Planning (MOP) and ODs (World Health Organisation et al., 2012). Despite significant improvements in the health system over the last two decades, coverage of human resources for health remains low at just 2.3 physicians and 7.9 nurses and midwives per 10,000 people (World Health Organisation, 2014c), well below the WHO

minimum threshold of 25 physicians, nurses and midwives per 10,000 people (World Health Organisation, 2006).

3.3 Equity in Cambodia's health policy

Health inequity recurs as a prominent theme within Cambodia's health policies, as does a specific focus on striving for equity in maternal and newborn health. Cambodia's Second Health Sector Strategic Plan (HSP2) (2008-2015) outlines the Ministry of Health's (MOH) vision for the "*sustainable development of the health sector for the better health and well-being of all Cambodians*" (Ministry of Health, 2008). This vision is premised in part on a commitment to equity and the right to health for all. The HSP2, in reviewing successes and challenges during its first incarnation, HSP1, acknowledges that there is evidence of regional disparities in service utilization between urban and rural areas and also that treatment rates vary substantially by socio-economic status. Importantly, it is acknowledged that not only those below the poverty line, but also those just above it face severe difficulties paying for healthcare. Furthermore it is recognized that health equity was not sufficiently considered in the planning and monitoring of HSP1 (Ministry of Health, 2008). The focus in HSP2 is on improving and expanding current social health protection mechanisms such as HEFs, community based health insurance (CBHI) and social health insurance for the formal sector. One of the plan's five strategic areas focuses on health care financing, within which a commitment is made to increase efforts to reduce financial barriers to accessing quality health care and catastrophic health expenditures through strengthening current social health protection mechanisms. This theme cuts across the three priority health areas, one of which is reproductive, maternal, newborn and child health (Ministry of Health, 2008). Progress towards achieving HSP2 is supported by a multi-donor group implementing the Health Sector Support Programme 2 (HSSP2),

comprised of AusAID, the World Bank, the UK Department for International Development (DFID), the Belgian Technical Cooperation (BTC), UNICEF and Agence Francaise de Developpement (AFD) who created a pooled fund of £35million for technical assistance to HSP2 and the MOH between 2009-2013. DFID and BTC no longer have an in-country presence in Cambodia, although DFID continues to contribute money to HSSP2 through AusAID.

The National Social Protection Strategy for the Poor and Vulnerable (2011-2015) (NSPS) was developed by Royal Government of Cambodia's Council for Agriculture and Rural Development, but for which all ministries have responsibility in terms of implementation. The NSPS complements the HSP2, and its focus on social protection. It aims to "*relieve chronic poverty and food insecurity, assisting the poor to cope with shocks and building human capital for the future to help break the cycle of poverty*" (Royal Government of Cambodia, 2011a) (p.47). The NSPS highlights that health shocks disproportionately affect the poor and the near poor due to high risk and physical jobs, poor nutrition, less access to clean water and sanitation, poor housing conditions, less access to health and social services and a lack of savings. A vicious cycle of poverty is understood to perpetuate health shocks for the poor through high costs of accessing health care, high related OOP payments and subsequent indebtedness with staggeringly high interest rates often forcing sale of assets, particularly land. Pregnant women generally are also outlined as a group vulnerable to such health shocks. The strategy identifies differential health outcomes and utilization rates across socio-economic groups in Cambodia as inequity issues that require attention; inequity in emergency obstetric and newborn care is highlighted as of particular concern (Royal Government of Cambodia, 2011a). As per the HSP2, the NSPS also outlines user fee exemptions, HEFs and CBHI as the three main existing programmes to protect the poor, and near poor in the case of CBHI, by providing access

to healthcare. One of the key objectives of the NSPS is to ensure the poor and vulnerable have effective access to affordable quality healthcare and financial protection in the case of illness. The main strategy outlined to achieve this is expansion of both HEFs for the poor and CBHI for the near poor. Specifically regarding the HEFs, the NSPS aims to streamline the types of HEF schemes currently being implemented across the country; streamline the benefit packages available across HEFs and harmonise the targeting approach used across the schemes.

3.4 Reproductive and maternal health

The National Fast Track Initiative Road Map for Reducing Maternal and Neonatal Mortality (2010-2015) (NFTIRM) details the MOH's strategy for meeting its MDG5 targets and the maternal and neonatal health goals encompassed within HSP2 (2008-2015). The road map comprises seven core components - emergency obstetric and newborn care (EmONC), skilled birth attendance, reducing unmet need for contraception, improving access to safe abortion services, behaviour change communication, removing financial barriers and establishing a maternal death surveillance and response system (Ministry of Health, 2010). The component on removing financial barriers recognises three main types of barriers – facility user fees, transport costs and opportunity costs of seeking care. User fee exemptions for the poor and health equity funds are described as existing mechanisms to remove financial barriers, however various challenges with these respective methods are outlined. The road map's strategy for removing financial barriers is premised on strengthening these existing mechanisms, as well as supporting conditional cash transfers to reduce opportunity costs related to healthcare use for the poor.

In 2010 89% of Cambodian women with a live birth in the preceding five years had at least one ANC visit with a skilled provider during their pregnancy, and 59.4% of women had more than four ANC visits. In the same period 53.8% of births were in health facilities, compared to 45.4% home births – a dramatic shift in delivery location since 2000, when 89% of births took place at home. 71% of all births were assisted by a skilled health professional in 2010, compared to 44% in 2005. 73.6% live births were followed by a PNC visit in 2010, 61.3% within 24 hours after delivery (NIPH et al., 2010).

The contraceptive prevalence rate in Cambodia is still relatively low. In 2010 34.9% of currently married women were using a modern contraceptive method, the majority using the daily contraceptive pill (15.4%) and the injection (10.4%). This is an increase from 27% of currently married women in 2005 (NIPH et al., 2010).

3.5 Health financing

Cambodia's health system is financed by a combination of government funding, donor aid, OOP payments, social health insurance schemes for civil servants and formal sector workers, health equity funds, vouchers, and government subsidy schemes for the poor, and CBHI for informal sector workers (Annear, Peter Leslie et al., 2012). In 2012 average health expenditure per capita was US$51; public health expenditure as a percentage of GDP was 1.3%. Of total health expenditure, 20.5% was from public sources, 13.3% from external sources (e.g. international donors), and 59.7% was out of pocket (OOP) payments (World Bank, 2014c). This is one of the largest proportions of OOP in the Western Pacific Region (World Health Organisation et al., 2012). Of the schemes targeting the poor, HEFs provide the greatest coverage, operating in 44 out of 77 ODs in 2011; CBHI has much lower coverage, an estimated 150,000 people across

13 schemes, or 1% of the population (University Research Company, 2011b). The Government's maternity incentive scheme is a supply-side financing intervention, which has operated since 2007. Under the scheme facility staff receive an incentive payment of US$12.5 in a hospital and US$15 in a health centre to share between them for every delivery that takes place in their facility, in addition to the fees charged to patients. The initiative is part of the Government's effort to improve the country's maternal health outcomes, with the view that if staff are incentivized by additional income, they will discuss the issue of place of delivery with pregnant women in their community and encourage them to come to the health facility (Ir et al., 2010a).

In the context of structural adjustment policies of the 1980s and 1990s, Cambodia's National Charter on Health Financing (1996) introduced user fees for health services nationally. Whilst formalising previously informal charges and only minimally increasing service costs, the poor subsequently suffered inhibited access to services, despite the existence of fee waiver policies targeting the poor (Bitran et al., 2003). User fee exemptions have typically not been extensively implemented as health facilities are not reimbursed for the free services provided under the system, removing any incentive to grant the poor fee exemptions (James et al., 2006). Health Equity Funds were initiated in Cambodia in 2000 to overcome underutilisation of health services amongst the poor within a user fee-heavy system; these are discussed in more detail in section 3.5.1 below.

CBHI also started in Cambodia around the same time as HEFs, providing insurance for the non-poor informal sector. CBHI schemes are voluntary in Cambodia, with premiums typically less than $3 per family per month and benefits varying from scheme to scheme. Generally, they provide access to public health services and

transport reimbursements for hospitals visits. CBHI has faced a lot of challenges in Cambodia and expansion of the schemes has been much slower than that of HEFs. Schemes are managed and operated by a variety of different organisations (University Research Company, 2011b).

The Strategic Framework on Health Financing (2008) aims that by 2015 the various fragments of Cambodia's health financing system will be combined under a single national system, in order to move towards universal health coverage (Royal Government of Cambodia, 2009). The Master Plan on Social Health Protection was developed to guide progress towards this aim. The vision of the Master Plan is to provide effective and equitable access to quality health services for all Cambodians by 2015 (Royal Government of Cambodia, 2009). The single 'mixed model' health financing strategy will comprise funding from government, donors, NGOs, OOP payments, private insurance, social and community based health insurance and health equity funding. The focus of the Master Plan is on expanding coverage of current health financing schemes, streamlining benefit packages across schemes, harmonizing provider payment mechanisms between schemes to avoid competition and complicated management of payments at the facility level, and the development of a coherent health information system to collect uniform administrative and financial information across the schemes, as a prerequisite for universal coverage (Royal Government of Cambodia, 2009). The schemes specifically highlighted for expanded coverage are user fee exemptions, HEFs for the poor, CBHI for the non-poor in the informal sector, and compulsory social health insurance for the private (National Social Security Fund) and public (National Social Security Fund for Civil Servants) formal sectors, the latter are currently being developed. As part of the plans to create a single health financing system, the Royal Government of Cambodia is linking HEFs and CBHI

and looking to move the supervision of these schemes under a national agency, and also to create a single fund for formal sector employees.

A patchwork of other donor- and NGO-funded mechanisms also operates in Cambodia to improve access to health services for the poor, the predominant mechanism of which is vouchers. At the time of writing there were three voucher programmes operating in Cambodia providing reproductive and maternal health services, covering 14 out of 77 provinces – the Reproductive Health Association of Cambodia (RHAC) vouchers, Marie Stopes International's (MSI) voucher projects (both of which were accessible for all women), and the Vouchers for Reproductive Health Service Project (VRHS), for which poor women are eligible. In addition the BTC maternal health vouchers programme have recently finished. As part of the focus of the thesis, VRHS is discussed in detail in section 3.5.2 below.

3.5.1 Health Equity Funds

The HEFs are a third-party purchasing scheme of healthcare for enrolled poor households (Hardeman et al., 2004; Noirhomme et al., 2007; University Research Company, 2011b). They provide access to a comprehensive package of services accessible at provincial level hospitals and are being rolled out to cover primary level services in an increasing number of areas (Ministry of Health, 2010; University Research Company, 2011b). HEFs operate in referral hospitals in 44 out of 77 ODs in Cambodia and in 28% of all primary level health centres (Annear, Peter Leslie et al., 2012; Ministry of Health, 2010; University Research Company, 2011b). The HEFs are funded primarily by donor support, and are managed by a variety of third party organisations - HEF Operators (HEFOs) - usually local NGOs, who are responsible for reimbursing providers for service costs incurred by HEF members (Annear, Peter

Leslie et al., 2012). The HEF Implementer (HEFI), in collaboration with the MOH, is the oversight body for all HEFOs and monitors implementation of HEFs, quality improvement of services, the claims and reimbursement processes and health information systems. The University Research Company (URC) has the role of HEFI and is funded by USAID (University Research Company, 2011b).

HEFs entitle eligible households to free or subsidised healthcare, and also to transport and food costs incurred whilst seeking healthcare. Due to the multiplicity of HEFOs, there is variation in the amount of funding within each HEF, in the benefit packages they provide, provider payment mechanisms used and also in the capacity of the different HEFOs to implement the programme (Bitran et al., 2003). The HEFs target poor households using the Ministry of Planning's ID-Poor system of pre-identification which interviews suspected poor households on a 3-4 yearly rotating basis. Identified beneficiaries are issued with a HEF card, which includes a photograph and details of all family members covered by the card. A post-identification system also operates at the hospital level, such that suspected poor clients who seek care without a HEF card can be interviewed at the point of service use for eligibility for one-off free access to services (Hardeman et al., 2004; Noirhomme et al., 2007; University Research Company, 2011b).

3.5.2 Vouchers for Reproductive Health Services (VRHS)

VRHS, funded by the German development bank, KfW, operates in a total of nine ODs in the three provinces of Kampot, Kampong Thom and Prey Veng. The three-year programme, implemented by EPOS Health Management, was initiated in January 2011. Three types of voucher are provided to poor women, for family planning, safe motherhood (ANC, delivery care and PNC) and safe abortion, all of which are

distributed free of charge. Transport costs (KHR500 (US$0.13)/km) and a food allowance for users are also included, which are reimbursed to voucher users on arrival at health facilities. Safe abortion vouchers are not distributed directly to villagers in the nine ODs, rather they are made available only at facilities, making the dynamics regarding their uptake different to that of the family planning and safe motherhood vouchers. The thesis investigates the family planning and safe motherhood vouchers only, which are distributed to villagers in their homes. The family planning voucher comprises seven coupons for individual services – two consultation visits to discuss contraceptive needs, IUD insertion and removal, contraceptive implant and removal, and sterilisation. The safe motherhood voucher comprises nine coupons for individual services – four antenatal care (ANC) visits, normal delivery, complicated delivery, caesarean section, and two postnatal care (PNC) visits. Women eligible to receive vouchers are those pre-identified as poor through the ID Poor system (discussed in detail in section 3.6), whilst suspected poor women without an ID-Poor card can also be interviewed at the point of voucher distribution by programme staff, using the MOP pre-identification tool (EPOS Health Management, 2010).

Vouchers entitle beneficiaries to free care with contracted public and some private facilities. Vouchers are distributed via voucher promoters (VPs) who each have a catchment area comprising several villages. VPs are voluntary positions, however they receive cash incentives of KHR2000 (US$0.50) for each voucher distributed, and a stipend of US$35 per month to cover petrol, motorbike maintenance, phone credit and other expenses. Incentive payments are important for VPs and will typically comprise a significant part if not all of their individual income. VPs raise awareness about vouchers to women by holding initial meetings, often at the village chief's house, to explain what the vouchers are and how they work. Prospective eligible women are

then visited by VPs in their homes to discuss the vouchers further and distribute them if women are interested. Family planning vouchers are distributed to all poor married women of reproductive age, whilst safe motherhood vouchers are distributed only to poor pregnant women. The voucher management agency (VMA) manages a disposition fund to reimburse providers for costs of services provided to voucher users. Providers are reimbursed on a fixed fee basis for each service provided. Used coupons are submitted by providers to the VMA at the end of each month, which then reimburses providers on a fixed fee for service basis. The VMA implements a spot check policy where 10% of claims per month are randomly selected and formerly checked to minimise the risk of fraudulent claims.

3.6 The ID Poor programme

The ID-Poor programme is a national system for identifying poor households in rural Cambodia. The Ministry of Planning (MOP) implements the programme with technical support from the German Development Agency, GIZ. The ID Poor specifically aims to identify poor households in a way that achieves a good match with villagers' perceptions and understanding of who is poor (World Bank, 2012a). The programme's purpose is to identify poor households such that social programmes can then target activities and resources to those most in need. The adoption of this national poverty screening system is intended to streamline and minimise the costly process of identifying beneficiaries that is otherwise repeated by each intervention working with the poor.

ID Poor has been operating in Cambodia since 2007, with GIZ support continuing until 2015. As of 2011 the programme expanded such that nearly all rural villages have

undergone poverty identification at least once. The programme operates in a cyclical fashion across the country, every year screening households in approximately eight provinces, such that each province is screened every three to four years (Royal Government of Cambodia, 2011c).

Local village authorities compile a list of households in their village believed to be poor. A group of village representatives (the VRG) interviews households on this list using a standardised tool to ascertain their standard of living, including assessment of type and quality of housing, ownership of land and assets, and source of household income (see Appendix 2 for ID Poor tool). The questionnaire score denotes their position above or below a national threshold specific to the tool. The village chief compiles households' scores and a final list of poor households is shared publically. Subject to community verification of households on the list, ID poor cards are issued to families identified as poor. Two levels of poverty can be identified; level one is the most/extreme poor, level two is moderately poor (University Research Company, 2011b).

HEFOs are one of the primary users of the ID Poor (University Research Company, 2011b). The VRHS project also allocates vouchers to women with ID Poor cards (EPOS Health Management, 2010). In addition, commodities such as mosquito nets, rice, blankets and containers are distributed to poor households using the ID Poor system.

3.7 Study sites – Kampong Thom province

Objectives 2 and 3 of the thesis, which explore the VRHS and the ID Poor, make use of primary qualitative data. Potential study sites from which to generate qualitative data were to be sampled from one of the three provinces where VRHS was operating.

Selection criteria comprising demographic, health worker coverage, voucher distribution and voucher up-take data were applied to all three provinces. Using equal weighting, provinces were ranked from one to three against each criterion (see Appendix 3). Kampong Thom was the middle ranking province overall and was selected as the focal study province for the qualitative component of the thesis, from which two study sites, one peri-urban and one rural, were randomly selected. The study site selection process is detailed in Chapter 4, section 4.4.2. Here, background information on Kampong Thom province is presented.

Located in the centre of the country, Kampong Thom is Cambodia's second largest province by area, and is made up of eight districts, 81 communes and 737 villages. The provincial town is also called Kampong Thom, and is located on the main highway between Phnom Penh and Siem Reap. Part of the province borders the Tonle Sap Lake, and much fish production takes place in Kampong Thom; it is also one of Cambodia's largest producers of cashew nuts (Kampong Thom Tourism, 2014). The province has a total population of 672,000 (National Committee for Sub-National Democratic Development (NCDD), 2009), 33% of which is poor, a reduction from 42% in 2004, based on a national, relative poverty rate calculated using household socio-economic and demographic variables (Eng et al., 2010). 69% of the female population and 74% of the male population is literate (NIPH et al., 2010). 89% of Kampong Thom's population are employed in agriculture (National Committee for Sub-National Democratic Development (NCDD), 2009). Ethnic minorities make up 2% of the population; 0.6% are Islamic Khmer and 0.1% are Vietnamese (National Committee for Sub-National Democratic Development (NCDD), 2009). In 2010 the infant mortality rate in Kampong Thom was 59 per 1000 live births, and the under five mortality rate was 67 per 1000 live births. The population of Kampong Thom is served through the public sector by two referral hospitals and 50 health clinics. The hospitals have six

doctors between them and 26 secondary midwives operate at the local and also referral level (National Committee for Sub-National Democratic Development (NCDD), 2009).

CHAPTER 4 METHODS

This chapter comprises five sections. Section 4.1 details the overall aims and objectives of the PhD, followed by a discussion of the conceptual frameworks on which the thesis draws in section 4.2. Section 4.3 provides an overview of the data sources for the study and how these dovetail with the study objectives; section 4.4 comprises a detailed discussion of the empirical methods used to address each study objective; section 4.5 outlines funding and ethical approval for the study.

4.1 Study aims and objectives

The overall aim of this thesis is to investigate equity of access to reproductive and maternal health services in Cambodia.

The specific objectives are:

1) To estimate the extent of horizontal (in)equity of access to reproductive and maternal health services in Cambodia, and whether this has changed over the last decade.
2) To explore perceptions, experiences and the accuracy of the ID Poor programme, the mechanism used by Health Equity Funds and Vouchers for Reproductive Health Services to identify eligible poor beneficiaries for free healthcare.
3) To investigate low uptake of reproductive and maternal health vouchers in the Vouchers for Reproductive Health Services project.
4) To estimate the impact of HEFs, targeting free services to poor families, on healthcare utilisation, financial protection, and maternal and child health outcomes.

4.2 Conceptual framework

This thesis spans health economics and social epidemiology, in terms of the concepts on which it draws, and the research methods it applies. These two disciplines offer different theoretical insights to the question of what drives better health and health inequity. The thesis draws on theories within health economics relating to the determinants of demand for healthcare, focusing on what drives individual behaviour and how to understand market failure in health, and from social epidemiology on the various theories considering the societal and individual factors that affect health and its distribution. In addition, in exploring interventions designed to improve health equity, the thesis also draws on the proposed implementation processes of such interventions. Each of these conceptual issues is discussed below.

4.2.1 Health economics: proximate determinants of health and health inequity

The traditional economic demand function posits that demand for goods and services is a function of price, individual income, preferences, and the price of complementary or substitute goods and services (McPake et al., 2008). However healthcare is not a typical good or service; consumption of healthcare is affected by factors other than price (Dolan et al., 2002). In Grossman's theory (1972), demand for healthcare is derived from the demand for health. Grossman suggests that health, as a particular form of human capital, which he referred to as health capital, depreciates with age and necessitates investment to maintain. Health capital is produced through utilisation of healthcare, along with other health inputs, e.g. diet, exercise. Health capital determines the amount of time available to work and earn an income. Therefore Grossman proposes demand for health care is determined by several factors other than price; it is the rational response to a health shock and leads us to divert resources away from consumption towards purchase of healthcare and other inputs that might

improve health. The demand for healthcare increases with age and with the depreciation of our health stock over time, whilst it decreases with education as the educated are deemed more efficient producers of health (Grossman, 1972).

Grossman's model is critiqued for under-acknowledging uncertainty in health (Jan et al., 2005; Muurinen, 1982). Furthermore, Grossman assumes individual control over healthcare consumption. This is not always applicable in contexts where healthcare decisions are not made by those demanding healthcare. Ensor and Cooper (2004), in a less formalised model, suggest demand for healthcare is a function of household and community factors, as well as prices and individual factors (Ensor, T et al., 2004). According to Ensor and Cooper, 'prices' comprise the price of the service, of substitute commodities, the distance cost of seeking care and the opportunity cost; 'individual and household factors' include age, gender, income, education and knowledge about the characteristics of and need for healthcare; 'community factors' include cultural and religious influences and social factors affecting individual preferences (Ensor, T et al., 2004). An interpretation of Ensor and Cooper's healthcare demand function is depicted in figure 4.1 below. Just as these factors are considered determinants of health, inequity in their distribution can be considered to determine inequities in health (Wagstaff, Adam, 2002).

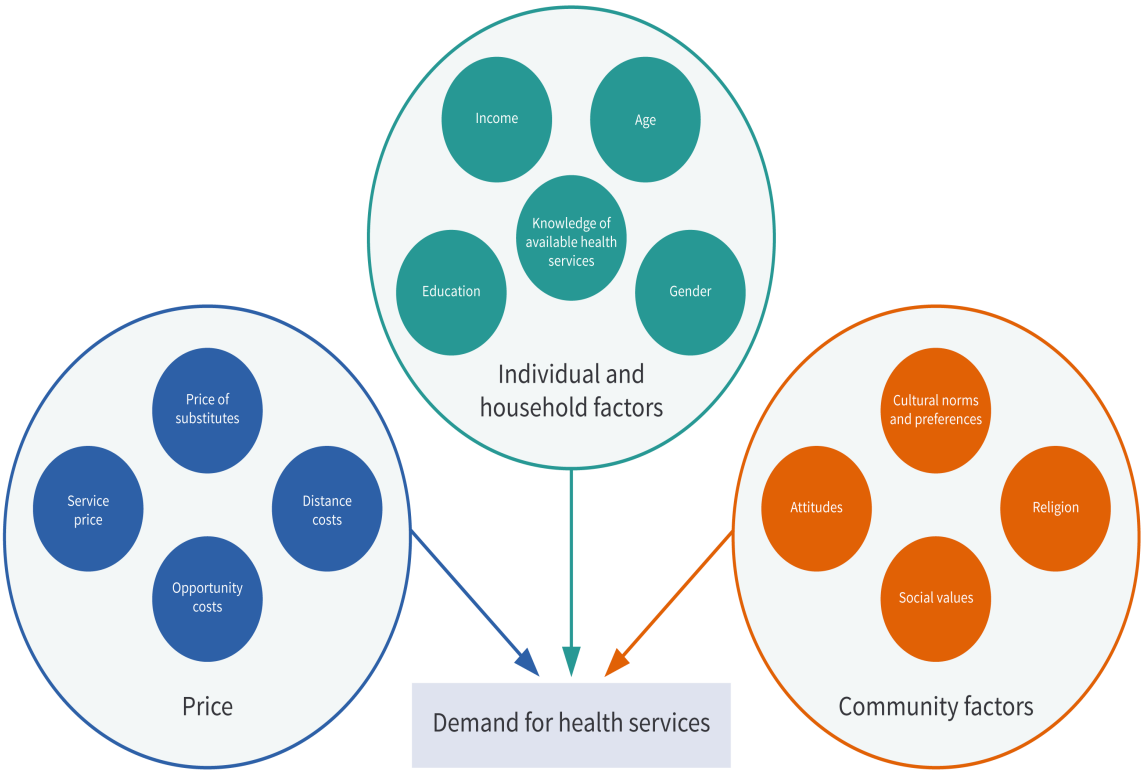


Figure 4.1: Factors influencing demand for healthcare, drawing on Ensor and Cooper (2004)

4.2.2 Social epidemiology: the social determinants of health and health inequity

As well as individual, household and community determinants, geographic and environmental factors, or those associated with health facilities have been found to determine reproductive and maternal health service utilisation, for example distance to health services (Chowdhury et al., 2006; Gabrysch et al., 2009, 2011; Rahman, M Hafizur et al., 2008; Yanagisawa et al., 2006); urban-rural location (Feng, Xing Lin et al., 2011; Gabrysch et al., 2009; González et al., 2010); and level of facility care (Gabrysch et al., 2011).

The social determinants of health is a prominent concept within social epidemiology comprising a breadth of health influences from individual risk factors to wider social factors such as the labour market or education system (Graham et al., 2004). Dahlgren and Whitehead's (1991) 'rainbow model' is one of the most widely referenced frameworks of the social determinants of health (Graham, 2007) (figure 4.2). It comprises concentric arches of influence upon the health of the individual, from socio-economic, cultural and environmental conditions, to the conditions in which we live and work, social and community networks, individual lifestyle factors, and various demographic and genetic factors, the latter of which Dahlgren and Whitehead suggest we have little control over (Graham, 2007).

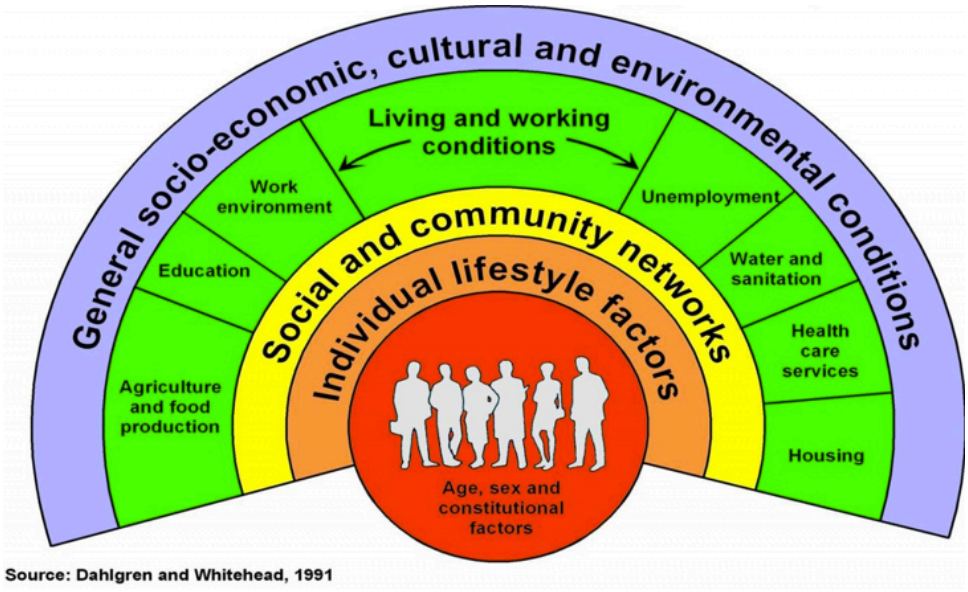
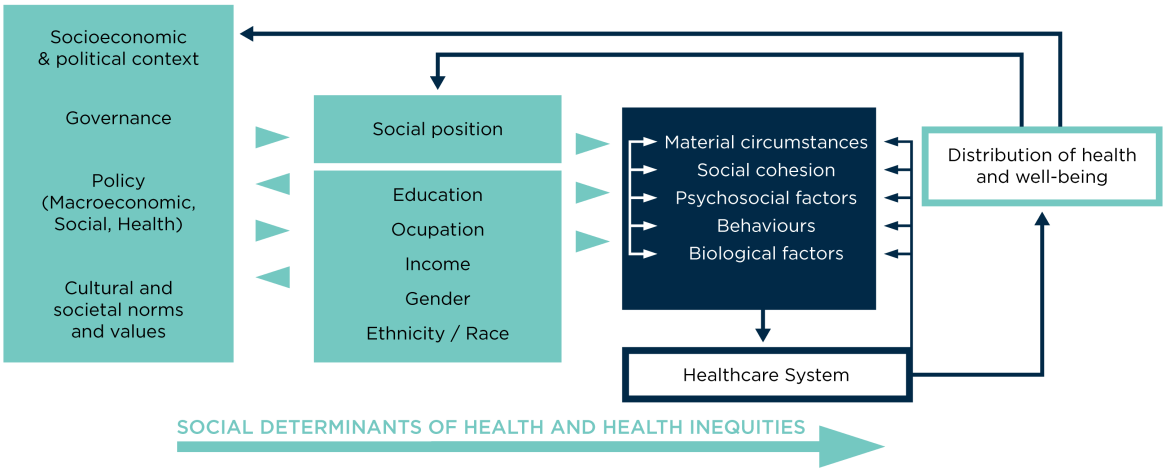


Figure 4.2: Dahlgren and Whitehead's rainbow model of the social determinants of health

The social determinants are argued to structure the conditions in which we are "*born, grow, live, work and age*" (Commission on the Social Determinants of Health, 2008),

incorporating proximate factors, as well as societal structural factors in explaining patterns of health service utilisation. More recent models emphasise individual social position (e.g. socioeconomic status, social class) as the pivotal point where social structural factors, or distal determinants, enter individual lives, impact on our conditions of daily living and ultimately our health (Graham, 2007; Graham et al., 2004) (figure 4.3). This framework draws on persistent trends of inequity within and between rich and poor countries to illustrate that equitable development in health is determined by a complex interaction of factors (Graham, 2007; Marmot, 2005, 2007; Ronsmans et al., 2006; Sen, 1999; Wagstaff, A et al., 2000; Wilkinson et al., 2010). The WHO Commission on the Social Determinants of Health (CSDH) (2008) states that the 'upstream' factors, the 'causes of the causes' of health inequity need more consideration, suggesting a "*toxic combination of poor social policies, unfair economics*



Source: Commission on the Social Determinants of Health, 2008

and bad politics is responsible for much health inequity" (Commission on the Social Determinants of Health, 2008).

Figure 4.3: Social determinants of health and health inequalities

There is considerable overlap between this model and Ensor and Cooper's (2004) model of demand for healthcare discussed above, although the social determinants of health framework extends beyond most health economics models of health determinants.

It is important to distinguish between the social determinants of health and the social determinants of health *inequities*. Tackling the determinants of health inequities requires focus on the unequal distribution of health determinants throughout a population. This is distinct from a general focus on improving social determinants (Graham et al., 2004; Kelly et al., 2007).

The frameworks discussed here provide a theoretical conceptualisation of what drives health, health-seeking behaviour, and disparities in their distribution. The ideas contained within these frameworks influenced the application of a mixed methods approach for this thesis, in order to contribute to the current body of evidence not only with estimations of trends in health equity and the impacts of DSF interventions, but also to enable some exploration of why such trends and impacts may be occurring, so as to further develop theoretical discussion of health determinants and disparities in their distribution. Part of the study design has specifically focused on aspects of the frameworks relating to the demand side and the financial determinants of health and their disparities, with two out of four studies addressing DSF interventions. Studies of equity trends and poverty identification within the thesis encompass more wide ranging factors that span several areas within these frameworks such as the policy and economic environment, and ones living and working conditions. The inclusion of both rural and peri-urban study sites for the qualitative research also reflects concepts within some of the epidemiological frameworks that our physical environment can influence our health seeking behaviour and determine inequities in health. In this way

the study design has been influenced by both health economics and social epidemiology disciplines.

The frameworks can be applied as lenses in order to perceive, interpret, deconstruct and understand the empirical findings of the thesis. The findings presented in Research Papers 1-4 in Chapters 5-8, and the discussion in Chapter 9, draw on these frameworks and reflect on the extent to which the various factors they hypothesise as influencing health, health-seeking behaviour and inequity in their distribution apply to the context of reproductive and maternal health in Cambodia. The concepts discussed here encourage structured reflection of the drivers that may have effected changes in trends in equity of reproductive and maternal health service use in Cambodia over the last ten years, and will aid interpretation of findings under Objective 1/Research paper 1 of the thesis. These theoretical constructs can also be applied to the insights generated under Objective 2/Research paper 2 in exploring the effectiveness of Cambodia's poverty identification programme, the ID Poor, to consider how these components and drivers of health-seeking behaviour might relate to households of different socio-economic status, and how they might change and differ for respective wealth groups. The frameworks will be particularly relevant to understanding low uptake of reproductive and maternal health vouchers in Cambodia (Objective 3/Research paper 3), by prompting consideration of which aspects of price vouchers are providing support for, and which others remain an on-going influence on health seeking behaviour. In analysing the impact of HEFs on financial protection, health outcomes and health service utilisation (Objective 4/Research paper 4), the frameworks will stimulate exploration of the channels through which price subsidies for the poor such as HEFs influence health and health seeking behaviour.

4.2.3 Implementation process of VRHS and HEFs, Cambodia

Consideration of health equity in this thesis is conducted in tandem with the study of interventions that aim to improve equity in service use and health outcomes in Cambodia. Objectives 2, 3 and 4 are all concerned with aspects of interventions designed to improve health equity – the ID-Poor, explored within Objective 2, has the sole purpose of identifying poor households in Cambodia to enable health and social interventions to target benefits to this group; VRHS and HEFs, addressed within Objectives 3 and 4 respectively, both utilise the ID-Poor system to target packages of health services to the poor for free. In studying these interventions it is useful to understand their implementation processes. Figure 4.4 depicts the stages of implementation of the ID-Poor, VRHS and HEFs, and the points at which they interact or meet. This logic model illustrates the five stages of the ID Poor that occur at the village level (other stages of the programme operating at commune, district, province and national levels are not presented here), and then the point at which VRHS and HEFs dovetail with the ID Poor. The model also presents an overview of the stages of implementation of both VRHS and the HEFs, mainly those involving beneficiaries; stages of the programmes regarding financial and administrative management for implementers and contracted providers are not presented here. Not all of the stages presented in figure 4.4 are investigated in detail through the qualitative analysis within the thesis; the specific stages analysed are detailed in individual research papers in Chapters 5-8. However, the diagram below provides a useful overview of the components of these programmes operating at the village level in Cambodia, and how they interact.

We return to these process diagrams in the research papers in Chapters 5-8 and in the thesis discussion in Chapter 9. They are used to aid interpretation of findings relating to the implementation successes and challenges of the various interventions under study.

4.3 Empirical methods

The following section details the empirical methods used within the PhD to address study objectives 1 to 4, specifically equity analysis, semi-structured interviews and framework analysis, descriptive analysis of voucher distribution and use, and difference-in-differences analysis. As the results presented in research papers 1-4 (Chapters 5-8) have been published, or have been prepared to be submitted for publication, there is some overlap between the methods described here, and the methods sections in each of the research papers. Limitations of the empirical methods are addressed in the individual research papers, and the overall limitations of the thesis are discussed in chapter 9.

The study was designed using mixed methods, combining analysis of secondary quantitative data (objectives 1, 3 and 4) with collection and analysis of primary qualitative data (objectives 2 and 3). Table 4.1 details the different data sources used within the study, the empirical methods that were applied to the data, and the respective research objectives that each method was used to address. Table 4.2 provides an overview of the timeline of activities conducted for the PhD.

4.3.1 Equity analysis

Objective 1 is concerned with estimating the extent of equity of access to reproductive and maternal health services in Cambodia. This section details the methods used to conduct this equity analysis, including a discussion of how equity and access have been defined, the data used, the variables developed and the statistical analysis undertaken.

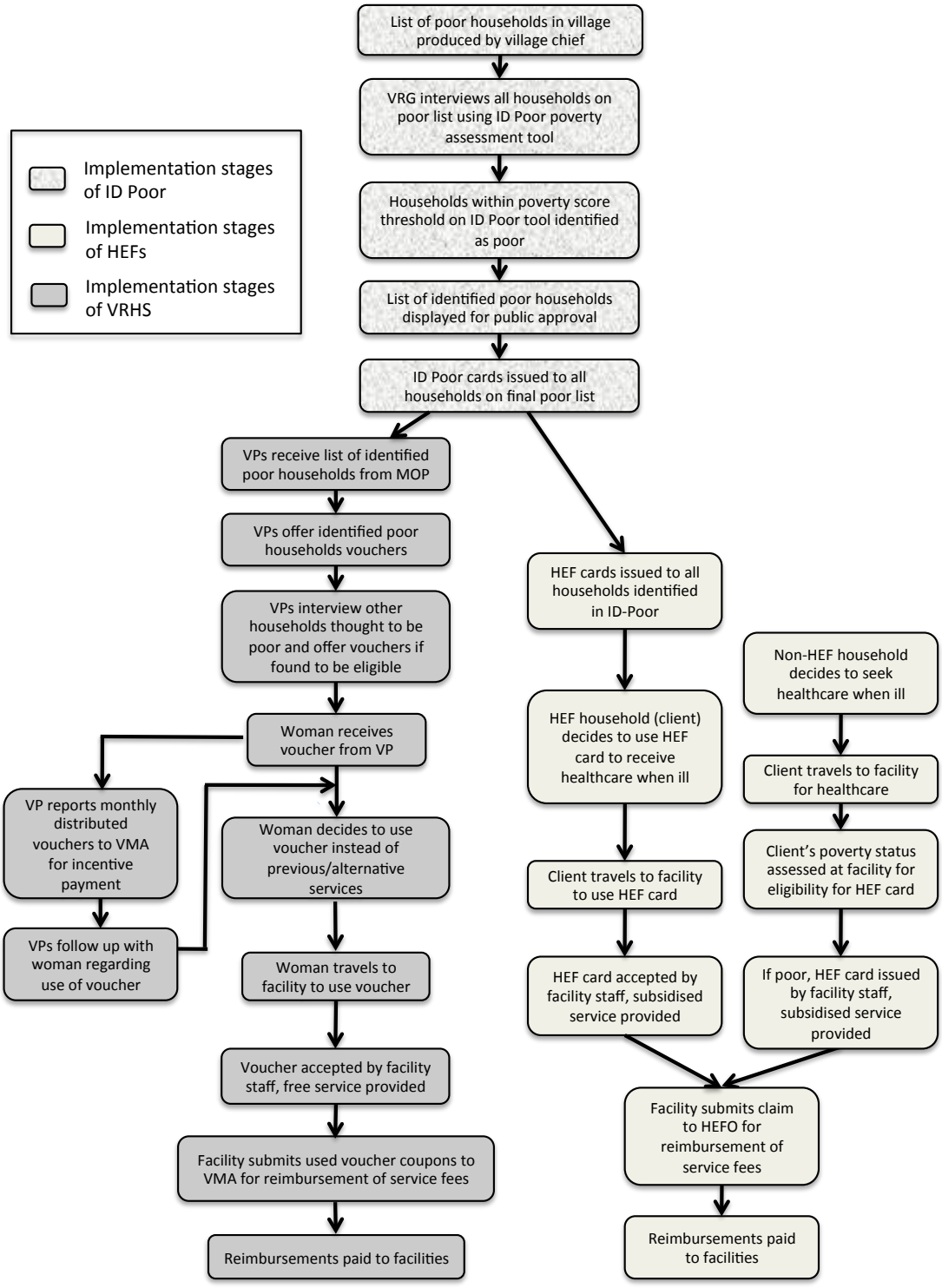


Figure 4.4: Process diagram of implementation stages of ID-Poor, HEFs and VRHS

Table 4.1: Data sources and empirical methods

Research objective	Data source	Data type	Empirical methods
1	Cambodia Demographic and Health Survey, 2000	Quantitative, secondary	Equity analysis
1	Cambodia Demographic and Health Survey, 2005	Quantitative, secondary	Equity analysis
1, 4	Cambodia Demographic and Health Survey, 2010	Quantitative, secondary	Equity analysis, difference in differences analysis
2, 3	Semi-structured interviews, Kampong Thom province, 2012	Qualitative, primary	Framework analysis
3	VRHS voucher distribution and use database, 2012	Quantitative, secondary	Descriptive analysis of voucher distribution and use
4	World Bank database of health financing interventions, Cambodia, 2010	Quantitative, secondary	Difference in differences analysis
4	University Research Company, coverage of MOP social health protection schemes, Cambodia, 2012	Quantitative, secondary	Difference in differences analysis

Defining health equity and access

Whilst differences within a population per se can be defined as health *inequality*, health *inequity* can be understood as differences in health and access to healthcare between societal groups that are deemed unfair (Blas et al., 2010; Braveman et al., 2001; Graham, 2007; Machenback, J et al., 1997; Victora et al., 2001). The analysis here focuses on horizontal equity, defined as 'equal treatment for equal need' (Culyer, A, 1995).

Table 4.2: Activity timeline of PhD

Study objective	Activity	2010	2011				2012				2013				2014			
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Literature reviews																	
	Additional modules and training																	
	Development of study aims, objective and methodology planning																	
	Upgrading																	
	Intensive Khmer language training																	
1	Equity analysis (Objective 1)																	
1	Write up of equity analysis into paper																	
1	Submission of equity analysis paper for publication																	
2&3	Recruitment and training of qualitative research team																	
2&3	Selection of study sites and familiarisation visit																	
2&3	Development and piloting of topic guides																	
2&3	Qualitative data collection																	
2&3	Translation and transcription of qualitative data																	
2&3	Preliminary analysis and feedback to participants																	
2&3	Analysis of qualitative data																	
	Maternity leave																	
2&3	Write up of qualitative analysis into two papers																	
4	HEF impact analysis																	
	Write up thesis																	
	Thesis submission for examination																	

Location - UK
Location - Cambodia

Goddard and Smith (2001) suggest that 'access' is comprised of multiple factors including availability of services, quality, cost and information about facilities. However, the indicators making up these factors are rarely evidenced, rather it is service utilisation which is typically observed, "*reflecting the extent to which 'potential access' is converted into 'realised access'*" (Goddard et al., 2001) (p.1151). Therefore here, as per previous studies, service utilisation is taken as an, albeit non-ideal, proxy for access (A. J. Culyer, 1995; Goddard & Smith, 2001; S. Morris, Devlin, & Parkin, 2009).

Data and variables

Demographic and Health Surveys (DHS) conducted in Cambodia in 2000, 2005 and 2010 were used to estimate horizontal equity in access to six reproductive and maternal health services over the last decade. All three Cambodian DHS's used the same methodology (NIPH et al., 2010). The DHS is a nationally representative household survey of men and women aged 15 to 49 years. The survey collected data on a range of indicators including maternal, infant and child mortality, fertility preferences, family planning behavior, utilization of maternal and child health services, women's status, and domestic violence (NIPH et al., 2010). The Cambodia DHS 2010 sampled approximately 18,700 women and 8,200 men in 15,600 households; the DHS 2005 sampled 17,256 women and 7,631 men in 14,243 households; the DHS 2000 sampled approximately 12,800 households and 15,500 women (NIPH et al., 2000, 2005, 2010). For all three surveys households were sampled from 14 individual provinces and five groups of provinces to produce 19 sampling domains, stratified into urban and rural areas. A two stage randomised sampling strategy was used in each sampling domain to identify villages to be sampled (selected with probability proportional to village size) and within each village, households to be sampled (NIPH et al., 2010).

Six binary health service variables were analysed – use of at least four antenatal care visits[2]; delivery with a skilled birth attendant (a trained doctor, nurse or midwife (World Health Organisation, 2004)); delivery in a health facility; use of a postnatal care visit; total met need for contraception[3]; and use of abortion by a skilled provider (a trained doctor, nurse or midwife).

Three social-stratifying variables were used, across which equity in the use of health services was estimated – household asset wealth, maternal education, and urban versus rural location. Household wealth, constructed through an asset index, has been argued to be a valid and reliable proxy measure for more robust indicators of wealth such as household income or consumption, which were not contained within the DHS (Filmer et al., 2001; Sahn, D et al., 2003; Wagstaff, Adam et al., 2003). However as the literature is not conclusive regarding the applicability of the household asset index as a measure of wealth (Chuma et al., 2009; Howe et al., 2008; Lindelow, 2006; Onwujeke et al., 2006), other social-stratification variables were also included in the analysis, to allow comparison of outcomes across a range of measures of socio-economic status.

The household asset index was constructed using principal components analysis (PCA). PCA extracts components - uncorrelated linearly weighted combinations of the original variables - capturing the maximum variance in the asset data. The first component explains the greatest amount of variance in the data, from which weights are derived for the assets to be included in the index (Lindelow, 2006; Machenback, J et al., 1997;

[2] The WHO recommend a minimum of four antenatal care visits during pregnancy as the international standard (www.who.int/gho/maternal_health/reproductive_health/antenatal_care_text/en/index.html)

[3] The proportion of married women or those in a union who are sexually active, fecund, who are using contraception to stop or delay childbearing

Vyas et al., 2006). Three categories of asset variables were used to produce the index – durable consumer goods (e.g. ownership of a refrigerator, television, telephone, motorbike, etc); quality of the dwelling (e.g. roof material, floor material, wall material etc); and access to utilities and infrastructure (e.g. main source of drinking water, type of toilet facility). All available variables in these categories in each year of the survey were included in the asset index. As DHS questionnaires varied slightly across the years, with data collected on additional variables in later years, there were some differences in the asset variables included in each year. The analysis was conducted using both a common set of assets from 2000 in each year, and the maximum set of assets available for each year, to determine any sensitivity of the results to a change in asset variables.

A continuous maternal education variable was created as an alternative social-stratification variable, totalling all years of education for each woman in the dataset. From this, five education categories were created – 0-3 years of education, 4-6 years, 7-9 years, 10-12 years, 13+ years – against which outcome variables were analysed. Urban/rural location was included as a binary social-stratification variable.

Statistical analysis

Descriptive statistics were calculated for women in each year of the survey, by health utilisation outcome. Overall coverage levels of service utilisation were calculated in each year of the data by tabulating health service variables. Subsequently four equity measures were estimated for each health service in each year, comprising a mix of relative and absolute measures – absolute differences in service use between rich and poor, equity ratios, concentration curves and concentration indices. Both relative and absolute measures were calculated as they respectively portray different aspects of the data, therefore for a detailed analysis it was felt necessary to consider both (Barros,

Aluísio JD et al., 2012). However as the concentration index exploits data on service use across the entire distribution of wealth, it provides the richest description of inequity and is therefore the preferred measure of equity. All data were weighted to account for the survey design.

Firstly, health service variables were tabulated by categories of the social-stratification variables, to produce proportions of health service use across consecutive categories of socio-economic status (SES) (household asset quintiles, maternal education categories, and urban/rural location). A 'health gradient' was generated across wealth quintiles (Graham et al., 2004), from which the absolute difference in service use between richest and poorest quintile was calculated. In addition to calculating service use by wealth category individually for each service per year, a composite coverage index was also calculated, which takes an equally weighted average of coverage levels for all six services per wealth category for each year (Barros, Aluísio JD et al., 2012; World Health Organisation et al., 2010).

Secondly, equity ratios (Wagstaff, A, Paci, et al., 1991), a relative measure for use of each health service in each year, were calculated by dividing the proportion of service use in the highest SES category (highest asset quintile/most education/urban location) by the proportion in the lowest.

Thirdly, concentration curves were plotted for all health services in each year of the data. The concentration curve is a relative instrument, plotting the cumulative sample population, ranked by wealth, against the cumulative proportion of health service utilisation. The diagonal line from the origin reflects perfect equality. Concentration curves lying everywhere below the line of equality reflect disproportionate service utilisation benefiting richer individuals within the population; curves lying everywhere

above the line of equality reflect disproportionate service utilisation amongst poorer individuals within the population (O'Donnell, O et al., 2008; Wagstaff, A, Paci, et al., 1991; Wagstaff, A, van Doorslaer, et al., 1991).

The concentration index is calculated as twice the area between the concentration curve and the line of equality and measures the extent of inequality systematically associated with wealth. The index takes a value between -1 and 1; 0 indicates perfect equity (O'Donnell, O et al., 2008; Wagstaff, A, Paci, et al., 1991). Unlike the equity ratio, the concentration index, also a relative measure, incorporates data from across the whole population, is sensitive to the distribution of the population across socio-economic groups and takes into account the socio-economic dimension of health, ranking populations by wealth rather than health status (Wagstaff, A, Paci, et al., 1991). Indirectly standardised concentration indices were calculated as the fourth equity measure, standardising for age within the sample population (O'Donnell, O et al., 2008; Wagstaff, Adam et al., 2000). The concentration index can be defined in terms of the covariance of the health variable and the fractional rank of the individual living standards distribution (O'Donnell, O et al., 2008), and can be written as

(1) $$C = \frac{2}{\mu}\mathrm{cov}(h,r)$$

An equivalent computation of the concentration index based on a 'convenient regression' of a transformation of the health variable on the fractional rank of the living standards distribution was used in this thesis (O'Donnell, O et al., 2008), written as

(2) $$2\sigma_r^2\left(\frac{h_i}{\mu}\right) = \alpha + \beta r_i + \varepsilon_i$$

The weighted fractional rank variable was defined as

(3) $$r_i = \sum_{j=0}^{i-1} w_j + \frac{w_i}{2}$$

where w_i is the sample weight scaled to sum to 1, observations are sorted in ascending order of living standards, and $w_0=0$ (O'Donnell, O et al., 2008).

To produce an indirectly standardised index, the standardising variables (e.g. age) were included directly into the convenient regression shown in equation 2 above (O'Donnell, O et al., 2008). The indirectly standardised index corrects the distribution of the health variable across the sample by comparing it to the distribution that would have occurred had all individuals had the same mean age effect as the entire population.

When a concentration index is calculated based on a binary outcome variable such as service use, the bounds of the index are not -1 and +1, rather they are μ-1 and μ+1 (Wagstaff, Adam, 2011). To overcome this Wagstaff (2011) argues that it is feasible and acceptable to normalise a concentration index by dividing it by its bound, i.e. if C is a standard concentration index, a normalised index, C_N, would be calculated as $C/(1-\mu)$. However Wagstaff accepts that a normalised concentration index estimates as *equally* inequitable two scenarios, one in which the richest 10% of the population have a positive health outcome and 90% do not, and one where the richest 10% and next richest 10% of the population have a positive health outcome and 80% do not (Wagstaff, Adam, 2011). The standard concentration index would indicate the latter of these two scenarios as slightly more equitable than the former, as the health benefit is less concentrated amongst the very richest in the population. In this paper this latter

level of sensitivity is preferred from the concentration index, as such indices were not normalised as per Wagstaff's recommendation (Wagstaff, Adam, 2011). Standard errors were calculated, enabling production of confidence intervals for each index (O'Donnell, O et al., 2008).

In addition to the equity analysis described above, multivariate logistic regression analysis was also conducted to explore associations between household wealth and service use, whilst controlling for covariates. A parsimonious modelling approach was used, whereby all potential covariates were initially included in the model, with those variables lacking a statistically significant association with the outcome variable systematically removed to produce a final adjusted model. Covariates used in the analysis included age, religion, parity, marriage status, age at marriage, household size, rural or urban residence, woman's education, husband's education, and husband's occupation. Logistic regression analysis was conducted for each outcome variable in each year of the survey. All analyses were conducted in Stata 12.

4.3.2 Semi-structured interviews

Primary qualitative data gathered through semi-structured interviews were used in addressing study objectives 2 and 3, which explored Cambodia's ID Poor programme and the VRHS project.

Research site selection and sampling

A single study province from which to generate qualitative data for the thesis was selected from the three provinces in which VRHS is operating. Selection criteria comprising demographic, health worker coverage, voucher distribution and voucher up-take data were applied to all three provinces. Using equal weighting, provinces were ranked from one to three against each criterion. The middle ranking province

overall was selected as the study province – Kampong Thom (see Appendix 3). Project information on urban and rural communes within the study province was used to randomly select one urban and one rural commune. (The site selected from within the urban communes was actually peri-urban, rather than strictly urban, as is referred to forthwith as the peri-urban research site.) Within each commune are several villages, all of which are numbered within a national system. The first numbered village in the rural and urban communes respectively were selected as the study sites. The identity of the study sites has been kept confidential in order to protect the anonymity of study participants, which was assured to them on providing informed consent to participate in the study.

Study participants were purposively sampled across six sub-groups, chosen to provide a breadth of perspectives on the VRHS and ID Poor programmes. Details of all women of reproductive age from poor households identified in the latest round of the ID Poor, conducted in 2009 in Kampong Thom, were included in the sampling frame. This list of women was matched with details of women who had received and/or used safe motherhood and family planning vouchers from the VRHS database. From this, those who had used and not used their vouchers were identified. This sampling frame was used to randomly select participants within three sub-groups in each site – poor women who neither had nor had used a voucher (NN); poor women who had received a voucher but had not used it (RN); and poor women who had received a voucher and had used it (RU). Approximately three women per sub-group per site were recruited into the study. Once potential participants were identified using the sampling frame, VRHS staff helped to locate them. A fourth sub-group of participants was also created, non-poor women (NP), of whom approximately three were sampled per research site. Programme implementers comprised the fifth sub-group of participants, including staff from the VRHS project, the ID-Poor programme, and the HEFs. Health service

providers in rural and peri-urban sites were purposively sampled and recruited as a sixth sub-group of participants. A diagram of the sampling frame for data collection is presented in figure 4.5.

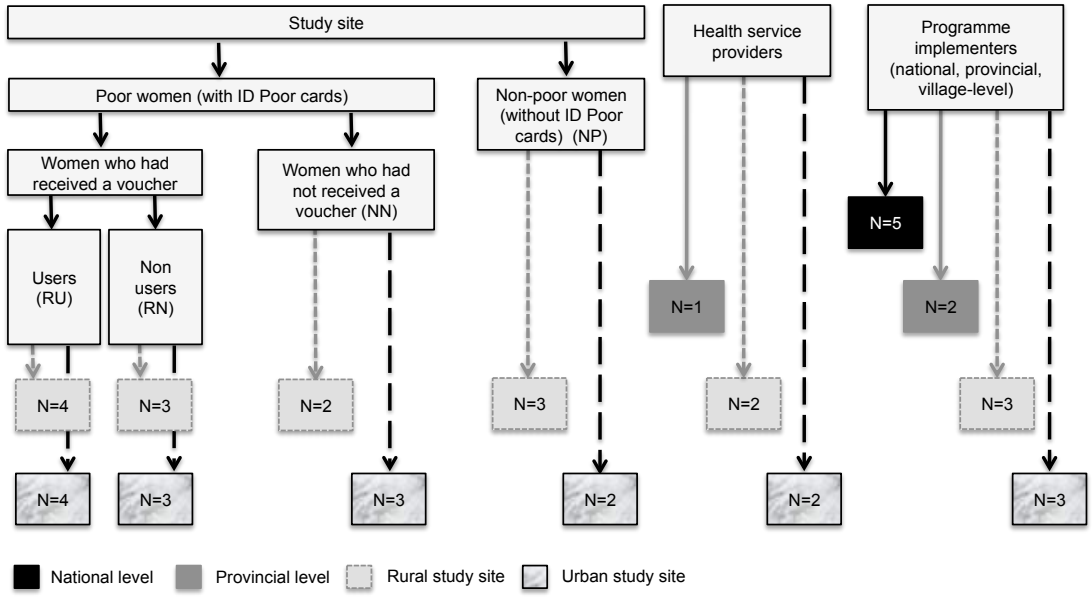


Figure 4.5 Sampling frame diagram

Data collection and management

Familiarisation visits were made to the study sites in Kampong Thom and to relevant project offices in Phnom Penh in advance of data gathering to discuss the study with potential participants and to recruit interested individuals. Visits were also made to public and private health facilities involved in the VRHS project, and meetings were held with provincial and commune level government staff focusing on health, with village chiefs and village health volunteers. Figure 4.6 presents photographs from peri-urban and rural study sites.

42 participants were included in the study, with data gathered through individual semi-structured interviews. One woman in the rural NN sub-group (not included in the final count of included participants) was approached to be included in the study and

did not agree to participate. Topic guides were developed for each sub-group of participants, piloted and refined before data collection commenced. They were further refined during the process of data gathering, as necessary.

Topics covered in the guides included women's experiences and decision making regarding use of services, perceptions of poverty in Cambodia, perceptions of the ID Poor programme, experiences with VRHS vouchers, perceptions of VRHS and the services it promotes, and discussion of other social health protection schemes in their area, including HEFs. Final topic guides are included in Appendix 4. Standard operating procedures were developed to guide each stage of data collection and management, see Appendix 5. Most semi-structured interviews were conducted with the help of an experienced female Khmer interpreter who consecutively translated the discussion between the English-speaking principal investigator and Khmer-speaking participants. Interviews were conducted directly in English wherever possible. I undertook two months of intensive Khmer language training prior to commencement of data gathering, to assist with following the content and flow of interviews conducted in Khmer. Three days of training with the interpreter was conducted before commencement of piloting. The training itinerary is included in Appendix 6.

Informed consent was gained from all study participants prior to data gathering. See Appendix 7 for sample consent forms and the information sheet provided to all participants approached for the study, in English and Khmer. Interviews were conducted in a private space wherever possible, usually in participants' homes or offices, to ensure they felt comfortable talking with us and could not be overheard. Consent was gained from all participants to digitally record interviews. Hand written notes were also made during the interviews.

Figure 4.6: Photographs of study sites

Health centre, rural site

Family planning room at rural health centre

Delivery room at rural health centre

Street in rural study site

Rural poor house

Rural non-poor house

Health centre, peri-urban site

Market, peri-urban site

Peri-urban poor house

Peri-urban non-poor house

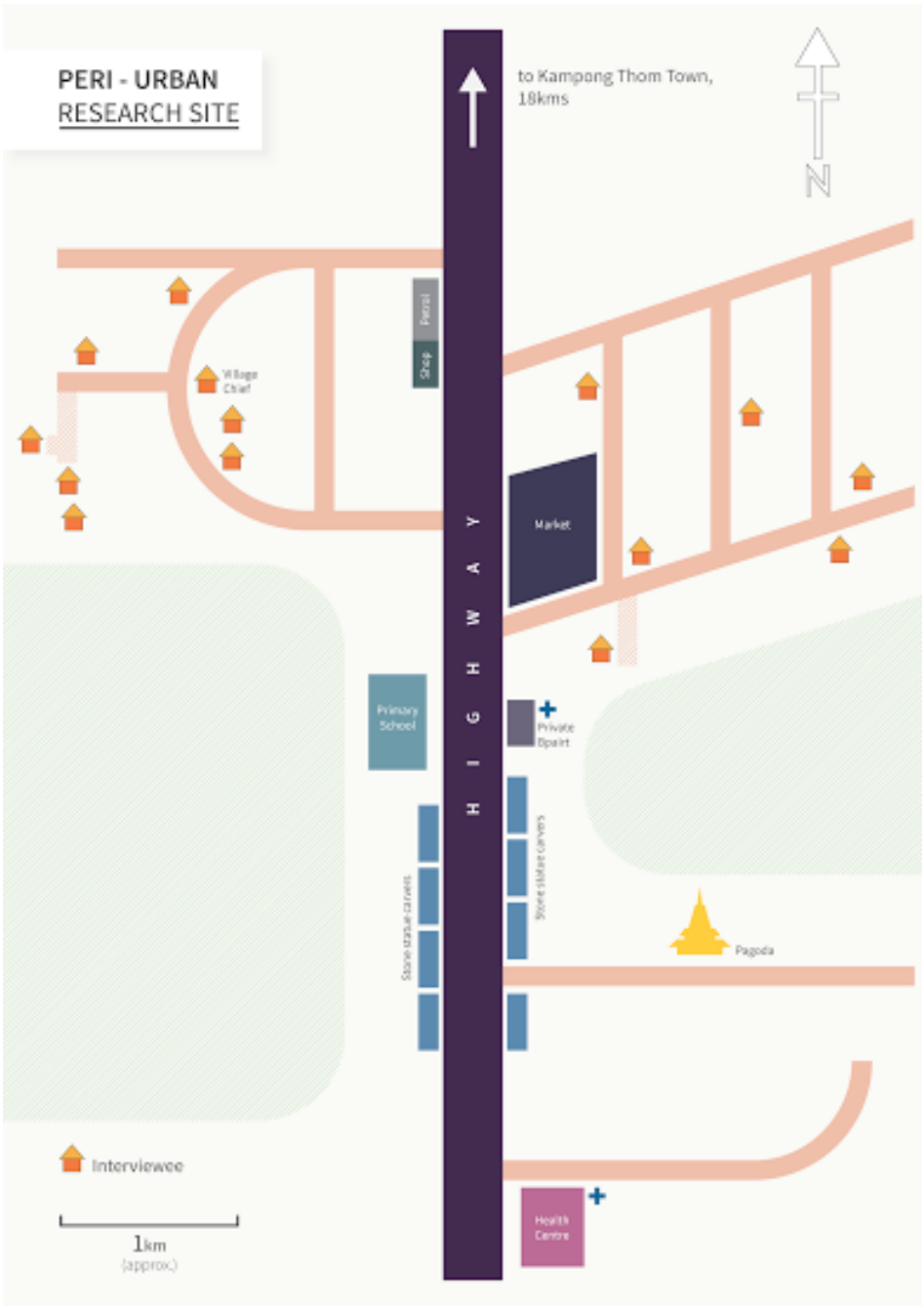
Contracted private voucher provider for long term family planning methods

Treatment room at contracted private voucher provider

The research team de-briefed after each interview, including a discussion of anything surprising that emerged during the interview, and any issues that challenged our assumptions about the topics under discussion. Where necessary, de-briefing sessions were used as an opportunity to tweak topic guides and inform revised approaches to subsequent interviews. See Appendix 8 for de-briefing discussion template.

Audio recordings of interviews were transcribed in Khmer and transcriptions then translated into English by a team of four additional translators, recruited for the study. This transcription team was briefed on the purpose of the study and interviews, and trained in how to use the standard operating procedures to guide their transcription and translation work. Quality assurance of transcriptions and translations was conducted by a Translation Advisor, who checked, edited and revised transcripts, where necessary, and advised the transcription team throughout the process. Figure 4.7 presents maps of the two study sites, illustrating the location of health centres, study participants and key references for each location.

Figure 4.7 Maps of rural and peri-urban study sites



Analysis

Qualitative interview data were coded in QSR International NVivo 10. A coding scheme was developed using a hybrid inductive-deductive approach, based on both initial familiarisation with the data and a pre-existing conceptual framework (Bradley et al., 2007; Fereday et al., 2006). Inductive codes were derived from careful reading and re-reading of the data transcripts and identifying issues and themes that were prominent

or recurrent in the data. Deductive codes were included in the coding scheme by drawing on themes and topics identified within theories used for the conceptual framework, in an attempt to capture key explanations of the demand for healthcare. The initial coding scheme was piloted for a sample of transcripts from across participant sub-groups, reviewed and refined before being applied to all data. Early on in the coding, one transcript was co-coded by a colleague to enable discussion about the coding scheme, provide additional insight and refinement to the process, and improve reliability of the analysis. The final coding scheme used for the qualitative analysis is include in Appendix 9.

A framework analysis approach was used whereby data were extracted from coded transcripts to populate thematic charts based on central themes within the data (Ritchie et al., 2003). Familiarity with the range of data relating to each theme was gained by re-reading data entered into chart columns, each representing sub-themes within the data. The fluency with the data that developed during this process enabled the researcher to carry a balanced perspective on dominant and recurring issues within the data, and helped to avoid selectivity in use of the data. The numbers of participants holding similar opinions about topics were noted during the analysis, to ascertain the extensiveness of certain perspectives or issues. Key dimensions within each sub-theme were identified and then summarised and interpreted into categories. Such categories were grouped where relevant to comprise a higher-level overview of the data within each theme. As themes emerged, data were crosschecked across sub-groups of participants to look for consistency and/or differences of opinion on issues. Categories of dimensions within the themes were considered and re-organised to tell the main stories emerging from the data. Once established, the themes and findings were discussed with the Khmer interpreter present throughout the data gathering, to

triangulate the interpretation of the data and to ensure it was true to the discussions undertaken during data gathering.

During the data analysis process, the researcher remained cognisant of the influence their own presence may have had on the discussions from which data were gathered (Green et al., 2005; Kuper et al., 2008; Pope et al., 2006; Reynolds et al., 2011). During the interviews most participants seemed relaxed and open to discussion with the research team; some behaved in a confiding manner, lowering their voices at certain points to discuss sensitive issues such as corruption within the village. Whilst the presence of a foreign researcher during the interviews may have hindered participants' inclination to be completely open during discussions, it is equally possible that they were more open with a foreign interviewer than they would have been with only Khmer interviewers.

Validation of preliminary findings from the data by respondents was sought (Green et al., 2005; Pope et al., 2006; Reynolds et al., 2011). The research team returned to all participants and discussed preliminary findings, either individually, or in a group setting, and provided an opportunity for participants to comment on whether our interpretation of the data were accurate, and reflected their experiences of the issues under study. Comments from participants were incorporated into subsequent stages of analysis.

4.3.3 Voucher distribution and use

To address objective 3, looking at the uptake of reproductive and maternal health vouchers within the VRHS project, descriptive quantitative analysis was undertaken, to complement the use of primary qualitative data within this objective. Quantitative data from the VRHS project database were used to analyse voucher distribution and use

since the start of the project, for all three provinces. The database included information on the date of voucher distribution, the type of voucher distributed and the number of coupons contained within it, for pregnant women receiving safe motherhood vouchers, their expected month and year of delivery and the dates individual voucher coupons were used. Details of vouchers distributed and coupons used are collated in two separate databases by the VMA; to analyse the data these were merged into a single database in Stata using the unique voucher codes. Permission was granted by the Voucher Management Agency to use their databases.

Analysis was conducted for data from all three VRHS provinces, for the period January 2011 (start of the project) to September 2012 (when the database was accessed). When analysing use of safe motherhood vouchers, the denominator was all pregnant women who received a safe motherhood voucher between January 2011 and November 2011 (which excluded women who had received a voucher but for whom insufficient time had elapsed for it to be used), and the numerator was women who received and used the safe motherhood voucher. When analysing use of family planning vouchers, the denominator was all married women who received a family planning voucher between January 2011 and June 2012 (which excluded women who had received a voucher but for whom insufficient time had elapsed for it to be used), and the numerator was women who received and used the family planning voucher.

4.3.4 Difference-in-differences analysis

To address objective 4, a difference-in-differences (DID) analysis was conducted to estimate the impact of HEFs on financial protection, use of maternal health services and selected health outcomes. The analysis involved a comparison of outcomes between poor (high exposure to HEFs) and rich (low exposure to HEFs) households in HEF and non-HEF districts. The following section details the data used and variables

developed, the sample used and the statistical analysis conducted in order to address Objective 4 of the thesis.

Data and variables

The analysis used DHS data for Cambodia from 2010. Outcome variables were developed from DHS data on healthcare utilisation, financial protection and maternal and child health. The survey also included data on household HEF membership and asset ownership, both of which were integral to the empirical analysis strategy (NIPH et al., 2010). The Cambodia DHS 2010 sampled men and women from approximately 15,600 households across 19 geographical areas. A two stage randomised sampling strategy was used in each sampling area to identify sample villages (selected with probability proportional to village size) and within each village, sample households (NIPH et al., 2010).

A total of 24 outcome variables were used in the analysis, organised in three groups – financial protection, service utilisation and health outcomes. Financial protection outcomes included whether OOP health expenditure for those ill in the last 30 days was zero, whether OOP health expenditure at a public health provider was zero, amount of OOP health expenditure, whether OOP health expenditure exceeded the 90th centile of spending amongst the uninsured (rich households), and whether assets were sold and/or loans borrowed to pay for healthcare. The total expenditure variable excluded observations with expenditure in the top 0.5% of the sample, to remove implausible values. Healthcare utilisation outcomes included use of a public health provider conditional on being sick, use of a public health provider if seriously ill, use of a private health provider, use of a public hospital if seriously ill, at least four ANC visits during most recent pregnancy, and institutional delivery for most recent pregnancy. Health status outcomes included binary variables and z scores for wasting (weight for height),

stunting (height for age) and underweight (weight for age) of children under five years, with z scores of -2 and below indicating malnourishment (World Health Organisation, 2014b), haemoglobin levels and anaemia status for children under five, and haemoglobin levels and anaemia status for women. Anaemia is a broad-based measure of health status, and a sensitive measure of malaria over time as it reflects multiple infections.

Geographical information in the DHS is based on Cambodia's administrative districts. However health-related activities in Cambodia, including implementation of the HEFs, are based around operational health districts, with different geographical boundaries to administrative districts. To link these data an operational district identifier was created for each household in the DHS data using the GPS coordinates of primary sampling units. Data on the presence of a HEF in each operation district and its start date were obtained from two databases on implementation of HEFs in Cambodia maintained independently by the World Bank and the URC.

Selection of the sample

The basic approach for this analysis was to compare households with different levels of exposure to HEFs, generated by variation in the geographical placement of HEFs and variation in HEF eligibility (determined by the ID Poor score). A critical step was to identify poor households who are eligible for HEF membership as well as rich households who are not targeted by the programme. The tool used by the ID Poor programme to assess household poverty, in principle, is the basis upon which HEF eligibility is granted. The ID Poor tool assigns points to different assets; points are aggregated according to what assets a household owns of those listed (see Appendix 2). The ID Poor score was partially reconstructed using data within the DHS (relating to dwelling roof material, dwelling wall material, ownership of livestock and other

animals, and ownership of forms of transport). The reconstructed score was based on the same points system used within the ID Poor, with values ranging from 0 (richest) to 30 (poorest). These data on asset ownership are attractive because they have not been manipulated by households seeking to be identified as poor and the reconstructed ID poor score, while incomplete, is a strong predictor of HEF membership.

Figure 4.8 shows the proportion of households with HEF membership at every value of the reconstructed ID poor score. In districts with a HEF, poorer households (higher score) were much more likely to be HEF members than richer households (lower score). Interestingly, HEF coverage reached little more than 40 percent even amongst the poorest households (suggesting some eligible poor households are excluded from HEF membership) and some of the richest households had HEF membership (suggesting some ineligible non-poor households are erroneously included). This is consistent with what we know about distribution of HEFs in the existing literature (World Bank, 2012). By contrast, in districts without a HEF, coverage was low across the entire distribution of ID poor scores, except for the poorest households who may have been granted HEF membership through post-identification when seeking care in neighbouring HEF districts.

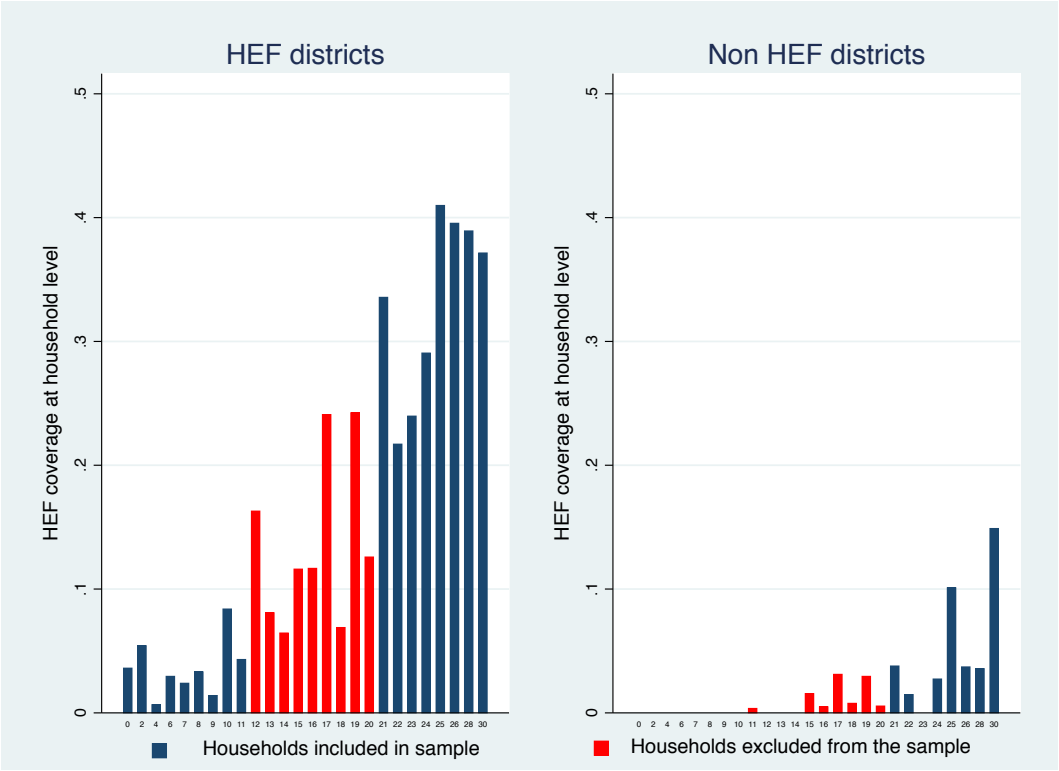


Figure 4.8: HEF coverage across poverty scores, based on data from Cambodia DHS 2010

For the purposes of analysis, households falling within a middle range on the poverty score were excluded, and those households at each end of the distribution were retained to create two groups referred to as "rich" and "poor"[4]. The threshold for poor households (a score of 20 or above) was selected to proportionally match the poverty threshold used in the ID Poor tool. The threshold to define rich households (a score of 11 or below) was selected after scrutinising HEF membership across the reconstructed ID poor scores, using Figure 4.8, and identifying an appropriate cut-off reflecting low HEF coverage. The final sample included 8715 households, of which 3495 were poor households in HEF districts, 3201 were rich households in HEF districts, 846 were poor households in non-HEF districts, and 1173 were rich households in non-HEF

[4] These are labels given to the two groups and they do not indicate whether individuals are rich or poor in an absolute sense.

districts. Figure 4.8 shows roughly a 25 percentage point increase in HEF coverage between rich and poor households in HEF districts but almost no increase in non-HEF districts. It is this greater variation that was used to identify the effect of the programme.

Statistical analysis

The analysis tested whether the HEFs had an effect on outcomes using a difference-in-differences approach (DID) that exploited variation in exposure to HEFs across districts and wealth status. This is analogous to a DID analysis that more commonly exploits variation in placement of a programme over time (Khandker et al., 2010). By examining poor and rich households who are more or less exposed to the HEF, an intention to treat analysis was in essence carried out.

Within a regression framework, the baseline model in DID analysis is estimated as follows:

$$Y = \alpha + \beta HEF + \chi POOR + \delta HEF \times POOR + e$$

where Y is the outcome, and the model includes a dummy variable for whether the district has a HEF, a dummy for whether the individual is poor (versus rich), and an interaction between the latter two variables. The coefficient δ on the interaction between the intervention variable *HEF* and household poverty status variable *POOR* gives the average DID effect of the intervention (Khandker et al., 2010).

The DID analysis captured the effect of HEFs on financial protection, service utilisation and health outcomes in HEF districts, controlling for effects resulting from factors other than the intervention itself. In the final adjusted model the variable HEF was replaced with district fixed effects and the variable POOR was replaced with individual

poor score fixed effects. The coefficient δ of the interaction term remained the DID estimate. Covariates used in the adjusted model varied according to the outcome studied, but typically included ownership of electricity, radio, tv, mobile phone, landline phone, fridge, wardrobe sewing machine, cd player, generator, watch, age of household head, education of household head, household size, rural/urban location, ownership of bank account, religion, (maternal) age, (maternal) education, child age, and parity. The coefficient of the interaction term is the DID estimate of impact. All models accounted for clustering in the survey design. Standard errors were clustered at the district level to avoid aggregation bias in the use of microdata (Moulton, 1990).

Robustness of the results was explored by testing for a divergence in outcome trends across wealth scores (for those in the rich group) between HEF and non-HEF districts. Sensitivity of the results to the poverty score thresholds used to define poor and rich groups, to including all outliers in health expenditure variables, and to the exclusion of ODs in which a government subsidy scheme (SUBO) was operating was tested. The analysis was conducted using Stata 12.

4.4 Funding and ethical approval

Funding for this PhD was provided by the Economic and Social Research Council, which granted a three-year studentship to the PhD candidate. In addition the Population Council, who were conducting a wider evaluation of VRHS in Cambodia, as part of an independent five-country voucher study, contributed to the fieldwork costs of the study. The funder had no role in the study design, data collection, data analysis, data interpretation or writing of the thesis.

Ethical approval for the study was granted by the Cambodian National Ethics Committee for Health Research, and by the Observational and Interventions Research Ethics Committee of the London School of Hygiene and Tropical Medicine.

CHAPTER 5 RESEARCH PAPER 1: EQUITY IN REPRODUCTIVE AND MATERNAL HEALTH SERVICE UTILISATION, CAMBODIA, 2000-2010

This chapter presents the first of four research papers developed for the thesis; each one addresses one of the study objectives. Research papers 2-4 are included in chapters 6-8 respectively. Research paper 1, presented here, addresses study objective one, to estimate the extent of horizontal equity of access to reproductive and maternal health services in Cambodia, and whether this has changed over the last decade. This paper was published in 2013 in the International Journal for Equity in Health. In addition to the analysis reported in the paper, supplementary results and discussion are included in section 5.7. This comprises multivariate logistic regression analysis not included in the published paper, and a discussion of how this relates to the results presented in the paper.

RESEARCH PAPER 1

A DECADE OF IMPROVEMENTS IN EQUITY OF ACCESS TO REPRODUCTIVE AND MATERNAL HEALTH SERVICES IN CAMBODIA, 2000-2010

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SECTION A – Student Details

Student	Antonia Dingle
Principal Supervisor	Timothy Powell-Jackson
Thesis Title	Equity of access to reproductive and maternal health services – equity trends, poverty targeting and demand side financing

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?		International Journal of Equity in Health	
When was the work published?		2013	
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Student Signature: _____Date: _____

Supervisor Signature: _____Date: _____

5.1 Abstract

Introduction

Despite encouraging reductions in global maternal mortality rates, Millennium Development Goal (MDG) 5 on reducing maternal mortality and achieving universal access to reproductive health remains the most off-track of all MDGs. Furthermore a preoccupation with aggregate coverage statistics masks extensive disparities in health improvements between societal groups. Recent national health indicators for Cambodia highlight impressive improvements, for example, in maternal, infant and child mortality, whilst substantial government commitments have been made since 2000 to address health inequities. It is therefore timely to explore the extent of equity in access to key reproductive and maternal health services in Cambodia and how this has changed over time.

Methods

Analysis was conducted on three rounds of Demographic and Health Survey data from 2000, 2005 and 2010. Outcome variables comprised utilisation of six reproductive and maternal health services – antenatal care, skilled birth attendance, facility-based delivery, postnatal care, met need for family planning and abortion by skilled provider. Four equity measures were calculated – equity gaps, equity ratios, concentration curves and concentration indices. Household assets were used to create the social-stratification variable, using principal components analysis.

Results

Coverage levels of all six services improved over the decade. Coverage improvements were greatest amongst wealthier quintiles of the population, although poorer quintiles also increased use of services. Critically, inequity in service use of all services dramatically reduced over time, except for postnatal care where inequity increased slightly. However, in 2010 inequity in service use remained favouring wealthier quintiles, greatest in use of skilled birth attendance and facility-based delivery, though

the magnitude of inequity was substantially reduced compared to 2000. Met need for family planning was almost perfectly equitable in 2010.

Conclusions

Cambodia has made impressive improvements in overall coverage of reproductive and maternal health services over the last decade, and also in the distribution of their use across wealth quintiles. It is probable that such achievements are linked to extensive pro-poor financing schemes such as the Health Equity Funds and vouchers that are rolling out across the country. Further research will explore specific schemes qualitatively and quantitatively to assess their impact on equity and service use.

5.2 Introduction

Recent estimates suggest global maternal deaths now total approximately 287,000 per year, of which 99% occur in developing countries (World Health Organisation, 2012c). These figures represent a promising decline over the last three decades (Hogan et al., 2010). However, Millennium Development Goal (MDG) 5 to reduce maternal mortality by 75% by 2015 and achieve universal access to reproductive health remains amongst the most off-track of all MDGs (Bhutta et al., 2010). Furthermore, consideration of only national-level statistics masks trends in the distribution of health outcomes and access to services across income groups. As the international health community considers a post-MDG agenda, with increasing focus on universal health coverage, it is essential to not only consider overall health improvements, but also how *equitable* those improvements are.

There is now a burgeoning focus on equity within the public health arena, although this has not always been the case, particularly in the maternal health field (Ronsmans et al., 2006). The growing literature on equity in reproductive and maternal health in developing countries suggests the stark disparities in maternal mortality, morbidity and in the use of reproductive and maternal health services are the "*largest discrepancy in public health statistics*" (Ronsmans et al., 2006). High levels of inequity have also been documented within countries, in skilled birth attendance (SBA), facility-based deliveries (FBD) and contraceptive use by wealth quintile (Amin et al., 2010; Baqui et al., 2008; Chowdhury et al., 2006; Gwatkin, Davidson et al., 2004; Houweling et al., 2007; Kunst, A et al., 2001; Magadi et al., 2003; Mohanty et al., 2009; Rahman, M Hafizur et al., 2008; Say et al., 2007; Zere et al., 2010), education status (Amin et al., 2010; Chowdhury et al., 2006; Collin et al., 2007; Zere et al., 2010), and urban versus rural location (Collin et al., 2007; Feng, Xing Lin et al., 2011; González et al., 2010; Houweling et al., 2007; Magadi et al., 2003; Ronsmans et al., 2003; Say et al., 2007;

Wirth et al., 2006; Zere et al., 2010), with better outcomes favouring more advantaged groups. The evidence is less consistent regarding use of antenatal care (ANC) (Amin et al., 2010; Baqui et al., 2008; Gwatkin, Davidson et al., 2004; Houweling et al., 2007; Magadi et al., 2003; Mohanty et al., 2009; Pallikadavath et al., 2004; Rahman, M Hafizur et al., 2008; Say et al., 2007; Zere et al., 2010), and data are very limited on postnatal care (PNC) (Amin et al., 2010; Zere et al., 2010). Globally rates of unsafe abortion have been found to be higher amongst young women, whilst there is evidence of higher complication rates and mortality from unsafe abortion amongst women of lower socio-economic status (Malarcher et al., 2010).

Most studies to date focus on one or two specific reproductive and maternal health services (Chowdhury et al., 2006; Feng, Xing Lin et al., 2011; Houweling et al., 2007; Kunst, A et al., 2001; Magadi et al., 2003; Rahman, M Hafizur et al., 2008), however few assess equity in use of the whole spectrum of services, from contraception to postnatal care (Amin et al., 2010; Baqui et al., 2008; Collin et al., 2007). Furthermore the majority of the literature focuses on a single year of data, inhibiting consideration of trends in equity over time (Amin et al., 2010; Baqui et al., 2008; Barros, Aluísio JD et al., 2012; Houweling et al., 2007; Kunst, A et al., 2001; Magadi et al., 2003; Rahman, M Hafizur et al., 2008; Ronsmans et al., 2003; Zere et al., 2010). Finally, state-of-the-art methods for measuring equity, such as concentration curves and indices (O'Donnell, O et al., 2008), are applied infrequently in studies of reproductive and maternal health equity (Baqui et al., 2008; Barros, Aluísio JD et al., 2012; Mohanty et al., 2009; Zere et al., 2010). Rather, studies tend to report general coverage levels or equity gaps, equity ratios and odds ratios of use in richest compared to poorest wealth quintile (Amin et al., 2010; Collin et al., 2007; Countdown 2008 Equity Analysis Group, 2008; Houweling et al., 2007; Karim et al., 2006; Kunst, A et al., 2001; Magadi et al., 2003; Rahman, M

Hafizur et al., 2008). This study attempts to address these critical gaps in the context of Cambodia.

In recent years Cambodia has made a concerted effort to address health inequities and the issue recurs as a prominent theme within many of the country's health policies, as does a focus on equity in maternal and newborn health (Ministry of Health, 2008, 2010; Royal Government of Cambodia, 2009, 2011b). A common element within these policies is the continued focus on and expansion of user fee exemptions, health equity funds (HEF) and community-based health insurance (CBHI) as core interventions to improve access to health services for the poor and near-poor. HEFs, funded by donors and government, provide health insurance for the poor at tertiary and increasingly at primary levels, through a third party purchaser of health services who reimburses providers for free services provided to those identified as poor. However out-of-pocket (OOP) payments on healthcare in Cambodia remain high with the cost of healthcare posing a poverty trap for the country's poor (Jonsson, 2008). In 2008 government health expenditure as a percentage of total health expenditure was 24%, whilst OOP expenditure as a percentage of total private health expenditure was 84.6% (World Health Organisation, 2011).

In this context, Cambodia makes an interesting case study within which to explore health equity and how this has changed since these policies were first introduced. As such, this paper aims to assess equity in access to reproductive and maternal health services – ANC, SBA, FBD, PNC, safe abortion and met need for family planning – over a decade in Cambodia.

5.3 Methods

5.3.1 Study setting

Cambodia is one of the poorest countries in South East Asia (AusAID, 2011). Of the 14.8 million population, 80% is rural (National Institute of Statistics, 2008). Between 2000-2008, an estimated 25.8% of the population were living on less than US$1 per day (World Health Organisation, 2011). Poverty has decreased somewhat over the last decade due to Cambodia's rapid economic development (World Bank, 2009). However Cambodia's transitioning economy has also ushered in increasing socio-economic inequalities. Cambodia's Gini index grew from 38 in 1994 to 44 in 2007, though the most recent estimate indicates Cambodia's Gini index dropped again to 38 in 2008. In 2008, income inequality in Cambodia was the second highest in the Mekong region, behind Thailand (World Bank, 2012b).

In terms of health financing policy, HEFs were initiated in Cambodia in 2000 to overcome underutilisation of health services amongst the poor within a user fee-heavy system. The HEFs are a third-party healthcare purchasing scheme, targeting poor households using the Ministry of Planning's ID-Poor system of pre-identifying poor households on a 3-4 yearly basis. Pre-identified households are eligible for free or subsidised tertiary healthcare, including reproductive and maternal care, for which providers are reimbursed by the Funds. A post-identification system also operates at the hospital level, whereby poor clients who seek care without an HEF card can be interviewed at the point of service use for eligibility to access free services (Hardeman et al., 2004; Noirhomme et al., 2007; University Research Company, 2011b). The HEFs are being scaled out across Cambodia, and scaled down to the primary level. HEFs now operate in referral hospitals in 44 out of 77 operational districts (ODs) and in 28% of primary level health centres, covering approximately 2.5million poor people (Ministry of Health, 2010; University Research Company, 2011b).

CBHI also started in Cambodia around the same time as HEFs, providing insurance for the non-poor informal sector. CBHI schemes are voluntary in Cambodia, with premiums typically less than $3 per family per month and benefits varying from scheme to scheme. Generally, they provide access to public health services and transport reimbursements for hospitals visits. CBHI has faced many challenges in Cambodia and its expansion has been slower than that of HEFs. Currently there are 13 schemes covering approximately 150,000 people (1% of the total population; 3.3% of the non-poor population), managed and operated by different organisations (University Research Company, 2011b). In addition, a patchwork of other donor- and NGO-funded demand side financing mechanisms operate in Cambodia to improve access to health services for the poor, such as vouchers and, less commonly, conditional cash transfers (EPOS Health Management, 2010; University Research Company, 2011a).

5.3.2 Outcomes

Six reproductive and maternal health utilisation variables were analysed: 1) use of at least four ANC visits, the World Health Organisation (WHO) recommended minimum number of visits during pregnancy (World Health Organisation, 2012a); 2) delivery with a skilled birth attendant, defined as a trained doctor, nurse or midwife (World Health Organisation, 2004); 3) delivery in a health facility; 4) a PNC visit with a skilled birth attendant after delivery (World Health Organisation, 2004, 2009); 5) total met need for contraception, defined as the proportion of married women or those in a union who are sexually active and fecund, who are using contraception to stop or delay childbearing (Rutstein et al., 2006); and 6) provision of abortion by a trained provider, defined as a doctor, nurse, midwife or other trained mid-level (non-physician clinician), in a health facility (World Health Organisation, 2012b).

5.3.3 Data and social stratification variables

Demographic and Health Surveys (DHS) conducted in Cambodia in 2000, 2005 and 2010 were used to estimate equity in access to the six reproductive and maternal health services over the last decade. The DHS is a nationally representative household survey of men and women aged 15 to 49 years. The Cambodia DHS 2010 sampled approximately 18,700 women and 8,200 men in 15,600 households (NIPH et al., 2010). For all three surveys households were sampled from 14 individual provinces and five groups of provinces to produce 19 sampling domains, stratified into urban and rural areas (NIPH et al., 2010). Data on use of abortions, FBD and SBA was collected from survey participants using a five year recall period; specifically for FBD and SBA this related to all live births in the five years prior to the survey. Data on ANC and PNC was collected only regarding the most recent live birth in the five years prior to the survey. Data on contraception use relates to current use at the time of data collection (NIPH et al., 2000, 2005, 2010).

Household wealth was used in the primary analysis as the social-stratifying variable across which equity in service use was estimated. For comparison, we also conducted an analysis with education as the social-stratifying variable, the results of which are reported in appendix 10a-c. Household wealth constructed through an asset index is argued to be a valid and reliable proxy measure for more robust indicators of wealth such as household income or consumption not contained within the DHS (Filmer et al., 2001; Sahn, D et al., 2003; Wagstaff, Adam et al., 2003). The asset index was constructed for each survey round using principal component analysis, incorporating three categories of assets – durable consumer goods (e.g. ownership of a refrigerator, television, motorbike, etc); quality of the dwelling (e.g. roof material, floor material etc); and access to utilities and infrastructure (e.g. main source of drinking water, type of toilet facility). All available variables in these categories in each year of the survey

were included in the asset index. As DHS questionnaires varied slightly across the years there are some differences in the asset variables included in each year. Therefore the analysis was conducted using both a common set of assets from 2000 in each year, and the maximum set of assets available for each year, to explore the sensitivity of the results to changes in the set of asset variables used to construct the wealth score. The results presented here are those estimated using all available assets per year; estimates based on a common set of assets are reported in Appendix 11a-b.

5.3.4 Statistical analysis

Descriptive statistics were calculated for women in each year by health service utilisation outcome variables. Individual service coverage levels were calculated in each year by tabulating health service variables by asset wealth quintiles. A composite coverage index was also calculated, taking an equally weighted average of service coverage per wealth category for each year (Barros, Aluísio JD et al., 2012; World Health Organisation et al., 2010). Subsequently four standard equity measures were estimated for each health service in each year – equity gaps, equity ratios, concentration curves and concentration indices.

The equity gap is the absolute percentage point difference in service use between the highest and lowest quintiles. The equity ratio is estimated by dividing service coverage in the highest quintile by that in the lowest. The concentration curve plots the cumulative sample population, ranked by wealth, against the cumulative proportion of health service utilisation. The diagonal line from the origin reflects perfect equality. Concentration curves lying everywhere below the line of equality reflect disproportionate service utilisation benefiting richer individuals within the population; curves lying everywhere above the line of equality reflect disproportionate service

utilisation amongst poorer individuals (O'Donnell, O et al., 2008; Wagstaff, A, Paci, et al., 1991; Wagstaff, A, van Doorslaer, et al., 1991).

The concentration index is calculated as twice the area between the concentration curve and the line of equality and measures the extent of inequality systematically associated with wealth. The index takes a value between -1 and 1; 0 indicates perfect equity (O'Donnell, O et al., 2008; Wagstaff, A, Paci, et al., 1991). The concentration index incorporates data from the whole population, is sensitive to the population distribution across socio-

economic groups and takes into account the socio-economic dimension of health, ranking populations by wealth rather than health status (Wagstaff, A, Paci, et al., 1991). As such it provides the richest description of inequity and is our preferred measure of equity. As this is our primary equity measure, indirectly standardised concentration indices, standardising for age within the sample population (O'Donnell, O et al., 2008; Wagstaff, Adam et al., 2000), are presented for the entire country and for urban and rural subgroups. Following O'Donnell et al (2008) we calculated the standard error and confidence intervals for each concentration index (O'Donnell, O et al., 2008).

5.4 Results

Descriptive statistics for DHS samples of women of reproductive age from 2000, 2005 and 2010 are presented in Table 5.1. Descriptive statistics for women by health service, by year, are presented in Appendix 12a-f.

Table 5.1 Socio-demographic characteristics of women 15-49yrs, Cambodia, 2000-2010

Year	2000		2005		2010	
Variable	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age (years)	29.67	10.14	29.80	10.30	29.87	10.19
Household size (people)	6.08	2.30	5.77	2.29	5.52	2.16
Urban residence	0.18	0.38	0.17	0.38	0.21	0.41
Highest level of education						
No education	0.28	0.45	0.20	0.40	0.16	0.37
Primary	0.55	0.50	0.56	0.50	0.49	0.50
Secondary	0.17	0.37	0.24	0.42	0.32	0.47
Higher	0.004	0.06	0.01	0.10	0.03	0.17
Religion						
Buddhist	0.96	0.19	0.97	0.17	0.97	0.16
Muslim	0.03	0.16	0.02	0.13	0.01	0.12
Christian	0.003	0.05	0.01	0.08	0.01	0.07
Other	0.01	0.10	0.01	0.09	0.01	0.09
Marital status						
Never married	0.32	0.47	0.32	0.47	0.31	0.46
Married	0.59	0.49	0.60	0.49	0.62	0.49
Widowed	0.06	0.24	0.05	0.23	0.04	0.23
Divorced	0.03	0.16	0.03	0.20	0.05	0.24
Not living together	0.01	0.07	0.02	0.17	0.01	0.16
Husband's occupation						
Did not work	0.03	0.18	-	-	0.03	0.18
Professional/technician/manager	0.11	0.31	0.06	0.24	0.11	0.31
Clerical	0.01	0.11	0.02	0.15	0.01	0.11
Sales	0.04	0.20	0.07	0.25	0.04	0.20
Agricultural self-employed	-	-	0.48	0.50	-	-
Agricultural employee	0.66	0.47	0.11	0.31	0.66	0.47
Services	0.01	0.11	0.07	0.25	0.01	0.11
Skilled manual	0.09	0.29	0.11	0.31	0.09	0.29
Unskilled manual	0.03	0.18	0.08	0.27	0.03	0.18
N (2000) = 15,305; N (2005) = 16,617; N (2010) = 18,504						

5.4.1 Trends in service use

Table 5.2 illustrates that coverage of reproductive and maternal health services in Cambodia has improved over the last decade, for some services substantially. The greatest increase in use was for at least four ANC visits during pregnancy, followed closely by FBD. The smallest change in coverage was in abortion with a skilled provider, though reported use of this service was already high in 2000 at 82% of all reported abortions.

5.4.3 Equity in service use

Equity gaps

Figure 5.1 graphs the composite coverage index by wealth quintile and year. This figure shows that utilisation across all services increased progressively each year. However, in absolute terms, utilisation increased the most for women in quintile 4 (second richest), closely followed by quintile 5 (richest). The percentage point increase in service use was smallest amongst women in quintiles 1 (poorest) and 2 (second poorest).

Similarly, the greatest absolute increases in maternal health service use (ANC, SBA, FBD, PNC) between 2000 and 2010 tended to be amongst the richer quintiles of the population, with the equity gap subsequently increasing over time for these services (Figure 5.2). Use of PNC services *de*creased for women in quintiles 2 and 3 between 2005 and 2010; increase in PNC use was almost double amongst the richest women compared to the poorest between 2000-2010. Met need for family planning and safe abortion were the only services where the equity gap in use between the richest and poorest quintiles decreased over time.

Table 5.2: Summary of magnitudes of inequities by health service, Cambodia, 2000-2010

	Year	N	Overall coverage (%)	Q1 coverage (%)	Q5 coverage (%)	Equity gap (Q5-Q1, % points)	Equity ratio (Q5/Q1)	Indirectly standardised concentration index (95% confidence interval)	Indirectly standardised concentration index - *rural* women (95% confidence interval)	Indirectly standardised concentration index - *urban* women (95% confidence interval)
4+ antenatal care	2000	6049	9.00%	2.20%	21.50%	19.30%	9.7	0.43	0.27	0.77
								(0.16,0.70)	(0.20,0.34)	(0.70,0.84)
	2005	6075	27.00%	13.80%	51.40%	37.60%	3.7	0.28	0.12	0.69
								(0.25,0.31)	(0.08,0.16)	(0.65,0.73)
	2010	6371	57.30%	37.40%	79.47%	42.07%	2.1	0.15	-0.08	0.58
								(0.13,0.17)	(-0.12,-0.04)	(0.55,0.61)
Skilled birth attendance	2000	8729	32.20%	14.30%	66.20%	51.90%	4.6	0.33	0.23	0.64
								(0.29,0.37)	(0.19,0.27)	(0.58,0.70)
	2005	8201	43.80%	14.40%	86.80%	72.40%	6	0.35	0.22	0.66
								(0.30,0.40)	(0.18,0.26)	(0.59,0.73)

	2010	8115	68.80%	42.20%	96.80%	54.60%	2.3	0.17	-0.05	0.58
								(0.15,0.19)	(-0.08,-0.02)	(0.51,0.65)
Facility based delivery	2000	8746	10.00%	1.80%	29.20%	27.40%	16.1	0.58	0.47	0.76
								(0.52,0.64)	(0.39,0.55)	(0.71,0.81)
	2005	8201	21.20%	5.20%	56.80%	51.60%	10.8	0.50	0.34	0.78
								(0.43,0.57)	(0.28,0.40)	(0.68,0.88)
	2010	8138	53.10%	29.20%	82.90%	53.70%	2.8	0.22	-0.03	0.60
								(0.20,0.24)	(-0.07,0.01)	(0.53,0.67)
Postnatal care	2000	8737	54.60%	40.90%	70.50%	29.60%	1.7	0.10	0.02	0.48
								(0.08,0.12)	(-0.01,0.05)	(0.41,0.55)
	2005	6076	67.60%	51.60%	84.60%	33.00%	1.6	0.09	-0.02	0.45
								(0.07,0.11)	(-0.05,0.01)	(0.37,0.53)
	2010	6374	73.80%	51.80%	90.20%	38.40%	1.7	0.12	-0.11	0.58
								(0.10,0.14)	(-0.14,-0.08)	(0.51,0.65)
Met need for family planning	2000	9306	24.41%	12.25%	36.64%	24.39%	2.99	0.21	0.09	0.64
								(0.18,0.24)	(0.04, 0.14)	(0.52,0.76)

	2005	10164	40.42%	30.65%	54.75%	24.10%	1.79	0.11	-0.03	0.50
								(0.09,0.13)	(-0.06,0.003)	(0.39,0.61)
	2010	11439	50.96%	41.60%	55.40%	13.80%	1.33	0.06	-0.11	0.40
								(0.52,0.07)	(-0.14, -0.8)	(0.35,0.45)
Abortion with a skilled provider	2000	261	81.90%	58.60%	97.70%	39.10%	1.67	0.10	-0.03	0.49
								(0.06,0.14)	(-0.10,0.4)	(0.24,0.74)
	2005	617	78.40%	58.10%	89.50%	31.40%	1.54	0.07	-0.12	0.44
								(0.04,0.10)	(-0.22,-0.02)	(0.27,0.61)
	2010	2101	84.50%	78.92%	83.16%	4.24%	1.08	0.01	-0.23	0.46
								(-0.02,0.04)	(-0.29,-0.17)	(-0.01,0.93)

Figure 5.1: Composite coverage index of reproductive and maternal health service use by quintile, Cambodia, 2000-2010

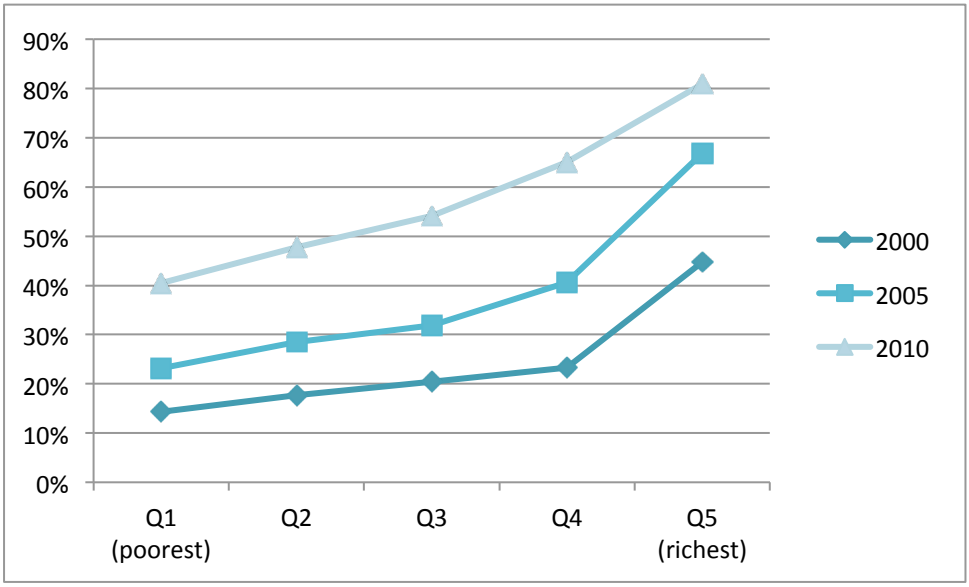


Figure 5.2a-f illustrates a positive wealth gradient in service use, whereby service use successively increases amongst richer quintiles compared to consecutively poorer quintiles. Use of at least four ANC visits, SBA, FBD and PNC in 2000 exhibited what some have coined 'top inequality', whereby the major difference in service use was between the top quintile and the rest of the population (Countdown 2008 Equity Analysis Group, 2008; Kunst, A et al., 2001). Over the last 10 years a shift is evident in the pattern of inequality in use of these four services, such that in 2010 wealth gradients now reflect a linear inequality, with service use progressively increasing through consecutive wealth quintiles from poorest to richest. Met need for family planning comprised a linear inequality pattern in 2000, with this virtually disappearing in 2010 (Figure 5.2e). Such changes in wealth gradient are less evident for use of a skilled provider for abortion (Figure 5.2f).

Figure 5.2: Reproductive and maternal health service use by wealth quintile, Cambodia, 2000-2010

Equity ratios

Equity ratios progressively declined between 2000-2010 for nearly all services, indicating that by this measure use has become more equitable over the last decade (Table 5.2). The greatest reduction in equity ratios was seen in FBD. Equity ratios remained approximately the same over the study period for use of PNC, suggesting that equity in service use has not improved for these services, however the overall level of inequity depicted by the ratio for PNC is relatively small.

Concentration curves

Inspection of concentration curves shows that for all three years, and for all six services, there is inequity in use favouring the rich, i.e. services are used disproportionately more by wealthier women than by poorer women (Figure 5.3). However there is an impressive trend of clearly decreasing inequity over time, as the curves become shallower between 2000 and 2010, particularly for ANC and FBD. Within each year the ranking of services by level of inequity remains approximately the same, with FBD consistently the most inequitable service, depicted by the deepest curve, followed by SBA. Family planning, and abortion by skilled provider are consistently the shallowest curves in each year, illustrating that these services have the greatest equity in use. By 2010 the curves for both abortion by skilled provider and met need for family planning virtually follow the line of equality, reflecting almost perfect equity in service use across socio-economic groups.

Concentration indices

Indirectly standardised concentration indices also clearly illustrate the striking improvements in equity in reproductive and maternal health service use over the decade (Table 5.2). The greatest decrease in indices was for FBD, which dropped remarkably from 0.58 to 0.22. However in 2010 across all six services, inequity

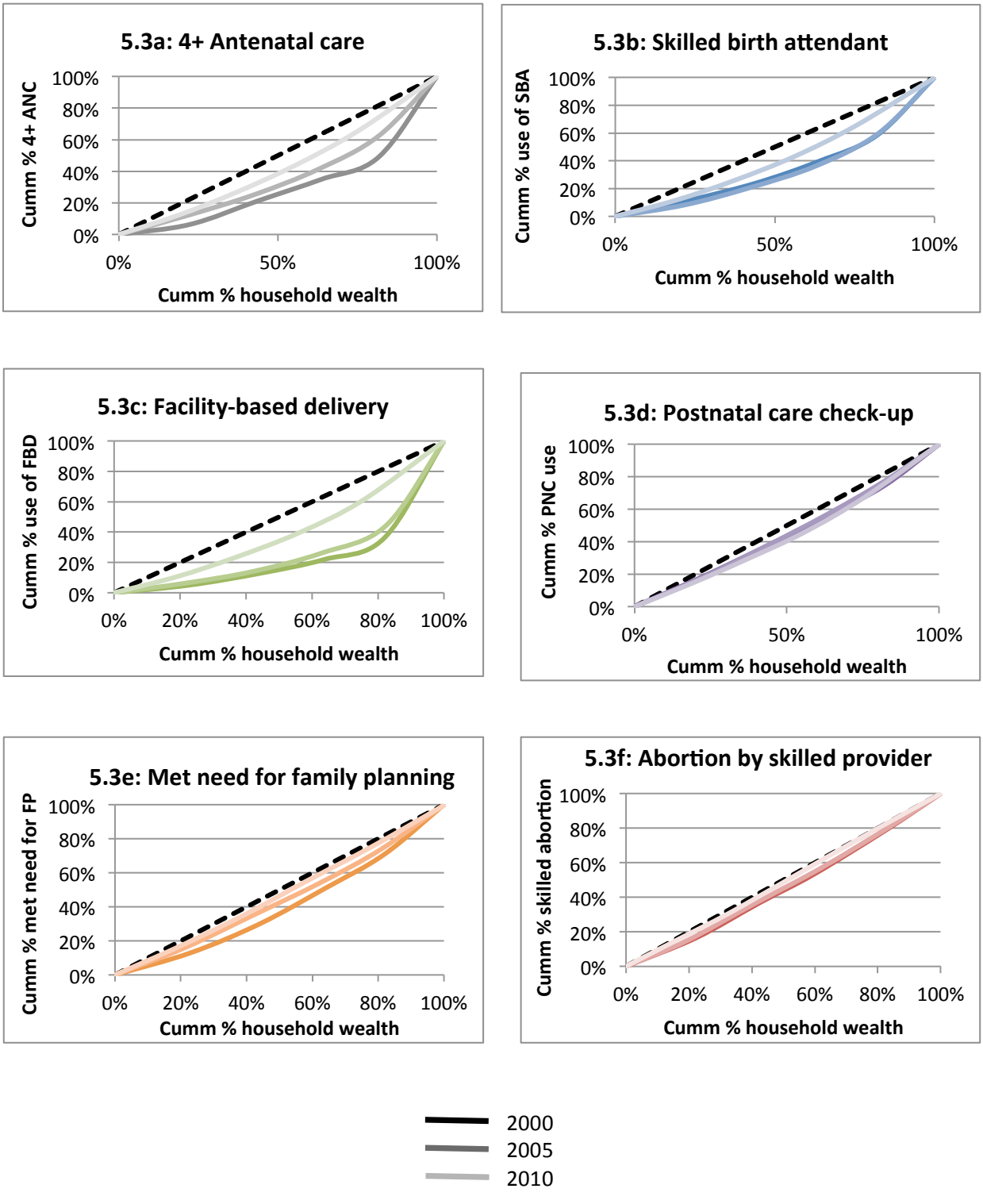
remained the greatest overall in FBD, closely followed by SBA. The service with the least improvement in equity in use over the last decade was PNC, for which the index increased, indicating an increase in inequity. The service with the index closest to zero, indicating perfect equity in service use was skilled abortion provider, closely followed by met need for family planning.

Similar trends were found when estimates of the concentration index were disaggregated by urban and rural areas. Equity in service use has improved over the last decade in both types of residence (Table 5.2). However, inequity in service use was substantially higher within urban compared to rural populations, across all six services. Amongst rural populations in 2010 there was in fact increasing inequality favouring the *poor*, such that poorer groups are accessing services disproportionately more than wealthier groups, with concentration indices becoming increasingly negative.

5.4.4 Robustness checks

Equity analysis using the household asset index was also conducted using a common set of assets in each year. Results of the comparative analysis of asset variables are presented in Appendix 10a-b. Concentration indices produced using differing asset variables diverged from those calculated using common assets typically by only 0.01-0.02 of an index. This suggests that the results are robust to changes in asset variables used to compile the asset index. Similarly, equity estimates measured using either household asset indices or education as the social stratification variable produced qualitatively similar results (Appendix 10a-c).

Figure 5.3: Concentration curves of reproductive and maternal health service use, Cambodia, 2000-2010



5.5 Discussion

5.5.1 Key findings

This study aimed to estimate equity in access to six reproductive and maternal health services in Cambodia over the last decade. The findings show that substantial progress has been made in Cambodia over the last 10 years, both in increasing population use of reproductive and maternal health services and in improving equity. Equity ratios, concentration curves and concentration indices indicate that inequity in service use has progressively decreased over time for ANC, SBA, FBD and unmet feed for FP; use of the latter was almost perfectly equitable in 2010. Although FBD remained the service with the greatest inequity in 2010, it also saw the largest improvement in equity of all services over time. Inequity remained stable at a low level for safe abortion; service use was almost perfectly equitable in 2010. PNC was the only service to experience a slight increase in inequity over the study period.

Service coverage and equity in service use are inter-related concepts, whereby high levels of coverage reflect low inequity in service use, as services will be reached by most of the population, regardless of socio-economic group. However, generalised low coverage across all socio-economic groups *also* results in low inequity in service use, as most of the population have the same low access to care (Oster, 2009). Therefore when interpreting equity analysis, it is important to be aware of overall coverage levels as well. Our results show both increases in overall coverage of service use and improvements in equity, suggesting that the former is not purely a consequence of increases in utilisation by the wealthiest.

The latest Cambodian DHS (2010) estimates a remarkable reduction in the maternal mortality ratio from 472 (CI 95%: 388, 605) deaths per 100,000 live births in 2005 to 206 (CI 95%: 124, 288) in 2010 (NIPH et al., 2010). Cambodia is reported to be on

track to achieve its MDG5 target of 140 maternal deaths per 100,000 live births by 2015 (World Health Organisation, 2012c). This is an impressive achievement given Cambodia's recent history of authoritarian rule and genocide experienced under the Khmer Rouge (1975-1979), followed by years of political unrest, which saw the MMR in 1990 at a staggering 830 per 100,000 live births (World Health Organisation, 2012c). The reduction in MMR is one of several key health indicators which the latest DHS indicates have improved in Cambodia including neonatal, infant and under five mortality, whilst overall increases in service coverage have occurred concomitantly with a drop in total fertility rate (NIPH et al., 2010). It is not possible to make any causal inferences about such improvements in health outcomes from the data available. However, it is noteworthy that these have occurred over the same period of time as the equity improvements in reproductive and maternal service utilisation reported in this paper.

5.5.2 Study limitations

Before interpreting the findings, we note several limitations of the study. Firstly, in the absence of available data on household consumption, we used a household asset index as a proxy measure for household wealth. There remains debate regarding the reliability and validity of the asset index as a measure of household wealth (Filmer et al., 2001; Lindelow, 2006; Vyas et al., 2006; Wagstaff, Adam et al., 2003). Secondly, data on service use collected within the DHS can have a recall period of between 2-5 years. However data on household assets relate to the year of data collection. As the wealth-poverty spectrum is dynamic, changing easily over time, there may be disparity between reported household assets at the time of the survey, and household assets at the time of the service use in question. Thirdly, analysis is limited to service utilisation, not health outcomes which are ultimately of interest, for example maternal mortality, total fertility rate, or abortion related complications. Fourthly, in this study it was not

possible to look at changes in service use between the poor and non-poor over time, because the DHS does not contain data which can be used to construct a satisfactory measure of poverty. Finally, data on abortion reported in the DHS may be unreliable, both through under-reporting of abortions and also regarding where abortion services were sought. Collecting data on abortion is particularly challenging due to the sensitivity of the topic. Fetters et al (2008) found in a nationally representative survey of public hospitals and health centres in Cambodia, reported abortions based on health facility records were 15 times greater than the DHS 2010 estimate (Fetters, T et al., 2008). Furthermore, research suggests Cambodian women often attempt multiple methods of abortion before going to a facility (Hemmings et al., 2008; Petitet et al., 2011). If more than one procedure and location has been used to abort a pregnancy, this may create errors and inconsistencies in the data.

5.5.3 Study findings and the existing literature

These findings support those in the existing literature, which present evidence of substantial inequities in use of SBA and FBD by wealth (Amin et al., 2010; Baqui et al., 2008; Chowdhury et al., 2006; Gwatkin, Davidson et al., 2004; Houweling et al., 2007; Kunst, A et al., 2001; Magadi et al., 2003; Mohanty et al., 2009; Rahman, M Hafizur et al., 2008; Say et al., 2007; Zere et al., 2010) and education (Amin et al., 2010; Chowdhury et al., 2006; Collin et al., 2007; Zere et al., 2010) favouring wealthier, more educated women. The general trend in the literature is also that urban women use reproductive and maternal health services more than rural women (Collin et al., 2007; Feng, Xing Lin et al., 2011; Houweling et al., 2007; Magadi et al., 2003; Ronsmans et al., 2003; Say et al., 2007; Zere et al., 2010). However using concentration indices with data disaggregated by urban/rural location, inequity in service use was actually dramatically higher within urban populations than amongst rural. Such estimates are not typically calculated in other studies. The findings support other studies which found evidence of inequity in

ANC favouring wealthier, more educated women (Amin et al., 2010; Baqui et al., 2008; Houweling et al., 2007; Mohanty et al., 2009; Pallikadavath et al., 2004; Rahman, M Hafizur et al., 2008), and also the few studies to date that assess inequity in use of PNC, which find service use favouring wealthier, more educated women (Amin et al., 2010; Zere et al., 2010). The findings concur with other studies in Asia which suggest that inequity in unmet need for family planning may be narrowing over time (Karim et al., 2006; Mohanty et al., 2009).

We are unaware of any other studies to date assessing trends in equity of reproductive and maternal health service use in Cambodia over time. The Countdown Equity Group (2008) included Cambodia in its assessment of equity in use of a group of health interventions in 54 countries, including family planning, ANC and SBA. However, this analysis produced a composite coverage index across all services, rather than considering specific trends for individual services. The Countdown study found that in Cambodia the coverage (equity) gap in the composite index decreased by 16.9 percentage points in Cambodia between 2000 and 2006. This supports the current finding of decreasing inequity in the six reproductive and maternal health services studied here (Countdown 2008 Equity Analysis Group, 2008). Mohanty and Pathak (2009) assessed trends in at least three ANC visits during pregnancy, safe delivery and unmet need for family planning in India between 1992-2005 using three sets of survey data by estimating concentration indices. Inequity improved over time for ANC and safe delivery, however the extent of improvement in equity was substantially less than was found in Cambodia. Conversely, whilst in Cambodia equity in met need for family planning also improved over the decade, in India inequity in unmet need worsened over the time period studied.

5.5.4 Explaining the findings

The last decade has seen the establishment of HEFs and CBHI in Cambodia, which aim to remove financial barriers faced by the poor and near-poor respectively in accessing services. HEFs began around the year 2000; by 2005 they were operating in approximately 17 ODs, with more than 27 ODs added between 2005 and 2010. HEFs and CBHI have substantial support from the Royal Government of Cambodia (RGoC) and donors as seminal mechanisms for targeting health services. However other schemes such as vouchers have also been implemented in more recent years to target the poor for specific health services e.g. reproductive, maternal and child health (EPOS Health Management, 2010). It is possible that the presence of all such initiatives has contributed to the reduction in inequity in service use of ANC, SBA, FBD and unmet need for FP found over the last decade, through raising awareness about available services, and reducing financial barriers to accessing such services for the poor. Ir et al (2010) illustrate that a combination of vouchers, HEFs and performance-based incentives for providers resulted in increased FBD in one province in Cambodia, though their analysis does not enable them to attribute specific impact to individual interventions (Ir et al., 2010a). More detailed analysis of the impact of these schemes on reproductive and maternal health is required. It is possible that a lack of service utilisation despite ownership of an HEF card or voucher and errors in targeting are contributing to the inequity in service use remaining in ANC, SBA, FBD and PNC today.

Such demand-side interventions have been implemented against a backdrop of wider efforts to improve maternal, obstetric and newborn care in public facilities over the last five to 10 years. Training of midwives has been a government priority since 2000, and recent estimates suggest that all health centres now have at least one primary midwife and 51% have a secondary midwife (Liljestrand et al., 2012). The RGoC's midwifery incentive scheme was introduced in 2007, providing $15 to health centres and $10 to hospitals for every live birth, to encourage increased use of public services for

deliveries and improved service quality. Concomitantly the government has banned deliveries by traditional midwives and strongly discourages home births attended by trained midwives (Liljestrand et al., 2012).

In addition to specific health policy interventions, changes in socio-economic conditions in Cambodia over the study period must also be acknowledged as possible contributing factors in the equity improvements in ANC, SBA, FBD and unmet need for FP found here. Cambodia has experienced impressive economic development since the early 2000s as a result of its expanding construction, textile and tourism industries. With this has come an increase in household consumption, a reduction in income inequality and a reduction in poverty (World Bank, 2013a). It is possible that such economic developments have influenced a greater use of reproductive and maternal health services. Concomitantly, as household income has improved and poverty has reduced, it may be that families are able to keep their daughters in education for longer, which is positively associated with increased use of reproductive and maternal health services. This is reflected in improvements in education over times; in 2000 28% of women or reproductive age in Cambodia had no education, compared to 16% in 2010 (NIPH et al., 2000; NIPH et al., 2010). Economic development in Cambodia has also facilitated improvements in infrastructure - roads, transport and mobile phone coverage. These vital services will have improved the populations' physical access to and communication with health facilities, supporting increased service use.

Met need for family planning stands out in the analysis as the most equitable service in 2010. However, *un*met need for family planning remained at 17% of currently married women in Cambodia. Whilst modern contraceptive prevalence has increased from 18.5% of currently married women in 2000 to 34.9% in 2010 (NIPH et al., 2010), this is still far from the MDG5 target of 60% by 2015 (Ministry of Health, 2010; Ministry of

Planning, 2010). Furthermore, studies suggest there are persistent negative rumours and misinformation held amongst Cambodian women regarding the use of contraceptives, whilst reported experiences of negative side effects and improper use are common (Hemmings et al., 2008; Petitet et al., 2011). Unmarried sexually active women (excluded from the calculation of unmet need for family planning in the DHS) have been found in qualitative research to be particularly poorly catered for in accessing family planning services and information about contraception (Hemmings et al., 2008). In addition, calculations of met need for family planning include women using both traditional and modern methods of contraception. More than one third of women currently reporting use of some form of contraception are using traditional methods in Cambodia (NIPH et al., 2010). It is likely that inequity in service use would be higher if met need for family planning was calculated for only those women using modern methods.

The greater inequity in service use in urban areas is likely to be the result of a more homogenous population existing within rural areas compared to urban areas where there is more diversity. However, HEF, CBHI and voucher programmes have also largely been focused in rural areas over the last decade, with HEFs only more recently operating in urban areas. Therefore it is possible that the urban poor have been more disadvantaged in accessing such benefits compared to the rural poor.

Abortion up to 12 weeks gestation was legalised in Cambodia in 1997. However there has since been slow progress in increasing use of safe abortion services (Fetters, Tamara et al., 2010; Hemmings et al., 2008). Much work has been conducted under the National Reproductive Health Programme to improve the training and quality of service providers of abortion, and raise awareness of available services. However use of public abortion services remains low (Fetters, Tamara et al., 2010; Hemmings et al.,

2008; Population Services International, 2010). Since 2009 Mifepristone and Misoprosol have been more widely available in Cambodia, increasing access to medical abortion, which can be administered at home. Such policy improvements could have contributed to the decrease in inequity in use of skilled abortion providers found here, however as discussed above, substantial under-reporting and risk of errors in the data related to sources of abortion will also have influenced the estimates produced.

5.6 Conclusion

Cambodia has made huge improvements in both coverage of reproductive and maternal health services and equity in use of these services over the last decade. Achieving improvements in maternal and reproductive health in practice requires attention to the distribution of service use and health outcomes within societies, as well as overall coverage rates. This study has highlighted the importance of equity analysis and the inadequacy of merely assessing aggregate coverage statistics. The growing literature on equity of access to health services in developing countries shows the persistence of inequities favouring wealthy, better-educated, urban populations. The findings in this study show that Cambodia has not escaped these trends, with disparities evident in 2010 in the use of four maternal health services between richer and poorer women; the greatest inequity found in use of FBD. However trends in equity of service use show that the direction of change is encouraging. Met need for family planning was found to be almost perfectly equitable in 2010. Such trends have been found in the context of extensive pro-poor financing interventions in Cambodia targeting poor households for free access to health services, and a wider programme of supply side improvements to the health system. The implication is that such financing initiatives are potentially having an effect on improving service use for the poor. Further research is needed to explore the specific impact of these financing mechanisms on use of reproductive and maternal healthcare, and also how equity in

service use changes in intervention compared to non-intervention areas. This will be addressed in further quantitative and qualitative work to be conducted. It would also be interesting to explore whether similar equity trends are evident for other services such as those focusing on child health. As we strive for universal health coverage, future health policies and interventions must prioritise those services currently found to be most inequitable, specifically use of FBD and SBA, and also service use amongst poor urban populations.

5.7 Research paper 1 supplementary results and discussion

In addition to the equity analysis documented in Results Paper 1, multivariate logistic regression was also conducted for use of each service in each year. The results for the outcome variables in each year are presented in table 5.3. The logistic regression illustrates that when controlling for confounding such as age, urban/rural location, education, husbands' occupation, parity, and religion, there remains a statistically significant association between household wealth, calculated using an asset index, and service use. Use of all six services was significantly more likely for women in higher than lower quintiles, after controlling for confounding. The magnitude of the association varied by service and by year. In 2010 women in the wealthiest quintile were almost nine times more likely to have a skilled birth attendant at delivery than women in the poorest, whilst these women were almost three times more likely to have at least four ANC visits during delivery than the poorest women. Trends over time in the magnitude of associations also varied by service. Odds ratios decreased between 2000 and 2010 for the association between wealth and use of antenatal care, facility-based delivery, family planning and skilled abortion. However they increased over the same period for postnatal care and skilled birth attendance. In 2010 the association between use of skilled abortion provider and household wealth was not statistically significant.

This logistic regression analysis supports the equity analysis reported in Research Paper 1, by illustrating the statistically significant association between household wealth and reproductive and maternal health service use in Cambodia for 2000, 2005 and 2010. It is because of this relationship that equity analysis exploring service use by wealth quintiles is appropriate, and suggests that the trends found in the equity analysis are unlikely to be indicative of factors other than wealth/poverty. Results

Paper 1 reports that equity in service use improved between 2000 and 2010 for ANC, SBA, FBD, met need for family planning and abortion with a skilled provider. As equity in use of these services improves, it is logical that the association between wealth and service use becomes less strong. Inequity in service use increased for PNC, which also supports the outcome of the logistic regression that the association between wealth and use of PNC increased over the study period. In 2010 regression analysis found a non-significant relationship between wealth and use of a skilled abortion provider, and equity analysis found service use to be almost perfectly equitable.

This analysis supports the existing literature which finds a significant positive association between wealth and use of SBA, FBD and ANC in several LMICs, estimated using logistic regression (Amin et al., 2010; Chowdhury et al., 2006; Exavery et al., 2014; Hagos et al., 2014; Kitui et al., 2013; Rahman, Mosiur et al., 2011; Say et al., 2007; Zere et al., 2013). It also contributes to the limited evidence regarding links between wealth and likelihood of use of PNC (Agha, S et al., 2011; Singh et al., 2012; Zere et al., 2010). The analysis complements research suggesting that unmet need for FP is significantly associated with poorer women (Malarcher et al., 2010), by illustrating that in Cambodia met need for FP is significantly associated with wealthier women. It is also shown here that the strength of this association decreased between 2000 and 2010, supporting other research, which indicates that socio-economic inequities in contraceptive use and unmet need for contraception are narrowing over time (Mohanty et al., 2009).

Limitations within the datasets used here regarding the reliability of data related to use of abortion services have already been discussed in Research Paper 1. As such whilst this analysis appears to suggest a dramatic reduction in the association between wealth

and likelihood of use of skilled abortion provider between 2000 and 2010, the outcomes related to safe abortion should be interpreted with some caution.

Table 5.3: Logistic regression analysis of association between reproductive and maternal health service use and socio-economic status, Cambodia, 2000-2010

Service	Wealth quintiles	Year	N	Unadjusted OR and 95% CIs	Adjusted OR and 95% Cis
Antenatal care	1 (poorest)	2000	5847	1	1
	2			2.63 (1.57-4.42)	2.53 (1.50-4.26)
	3			2.64 (1.42-4.89)	2.21 (1.20-4.06)
	4			3.05 (1.62-5.73)	2.28 (1.25-4.16)
	5 (richest)			14.47 (8.51-24.59)	5.78 (3.47-9.63)
	Pseudo R^2			0.09	0.15
	1 (poorest)	2005	5775	1	1
	2			1.19 (0.89-1.59)	1.11 (0.82-1.50)
	3			1.47 (1.12-1.93)	1.22 (0.92-1.62)
	4			2.16 (1.61-2.89)	1.57 (1.16-2.13)
	5 (richest)			6.66 (4.81-9.22)	2.99 (2.06-4.32)
	Pseudo R^2			0.08	0.13
	1 (poorest)	2010	6197	1	1
	2			1.26 (1.03-1.55)	1.17 (0.95-1.44)
	3			1.82 (1.48-2.24)	1.53 (1.22-1.90)
	4			2.62 (2.04-3.36)	1.78 (1.36-2.33)
	5 (richest)			6.04 (4.71-7.74)	2.87 (2.17-3.80)
	Pseudo R^2			0.07	0.14
Skilled birth attendance	1 (poorest)	2000	8474	1	1
	2			1.26 (0.96-1.64)	1.19 (0.91-1.55)
	3			1.82 (1.40-2.37)	1.46 (1.13-1.90)
	4			2.49 (1.90-3.26)	1.69 (1.28-2.21)
	5 (richest)			11.46 (8.69-15.13)	4.49 (3.43-5.87)
	Pseudo R^2			0.13	0.21
	1 (poorest)	2005	7853	1	1
	2			1.92 (1.46-2.53)	1.68 (1.27-2.22)
	3			2.44 (1.81-3.29)	1.90 (1.39-2.59)
	4			4.89 (3.60-6.63)	2.93 (2.13-4.03)
	5 (richest)			31.47 (22.29-44.44)	9.75 (6.78-14.02)
	Pseudo R^2			0.17	0.26
	1 (poorest)	2010	7934	1	1
	2			1.63 (1.32-2.01)	1.43 (1.15-1.78)
	3			2.66 (2.08-3.41)	2.10 (1.62-2.74)
	4			5.12 (3.93-6.67)	3.13 (2.37-4.14)
	5 (richest)			31.64 (20.61-48.57)	8.87 (5.43-14.49)
	Pseudo R^2			0.17	0.26
Facility based delivery	1 (poorest)	2000	8490	1	1
	2			1.31 (0.77-2.25)	1.21 (0.71-2.06)
	3			1.68 (0.98-2.86)	1.32 (0.76-2.28)
	4			2.98 (1.71-5.19)	1.80 (1.05-3.09)
	5 (richest)			21.01 (13.36-33.03)	5.27 (3.23-8.59)
	Pseudo R^2			0.18	0.28
	1 (poorest)	2005	7853	1	1

	2			1.55 (1.05-2.30)	1.44 (0.97-2.14)
	3			2.58 (1.81-3.68)	2.19 (1.52-3.17)
	4			3.95 (2.81-5.55)	2.75 (1.90-3.99)
	5 (richest)			28.23 (19.38-41.13)	10.19 (6.59-15.75)
	Pseudo R^2			0.21	0.26
	1 (poorest)			1	1
	2			1.43 (1.15-1.78)	1.28 (1.02-1.60)
	3	2010	7937	1.94 (1.53-2.46)	1.57 (1.21-2.03)
	4			2.83 (2.21-3.62)	1.85 (1.42-2.42)
	5 (richest)			10.77 (8.11-14.31)	3.68 (2.55-5.31)
	Pseudo R^2			0.12	0.17
Post natal care	1 (poorest)			1	1
	2			1.09 (0.89-1.34)	1.05 (0.85-1.30)
	3	2000	8467	1.16 (0.95-1.42)	1.06 (0.86-1.31)
	4			1.34 (1.06-1.70)	1.13 (0.89-1.43)
	5 (richest)			3.31 (2.61-4.19)	1.93 (1.49-2.50)
	Pseudo R^2			0.03	0.05
	1 (poorest)			1	1
	2			1.32 (1.05-1.66)	1.27 (1.01-1.59)
	3	2005	6034	1.43 (1.14-1.78)	1.32 (1.06-1.64)
	4			2.27 (1.80-2.86)	1.99 (1.58-2.50)
	5 (richest)			4.76 (3.62-6.27)	3.31 (2.50-4.37)
	Pseudo R^2			0.04	0.05
	1 (poorest)			1	1
	2			1.16 (0.91-1.47)	1.02 (0.79-1.30)
	3	2010	6201	1.40 (1.08-1.83)	1.12 (0.85-1.48)
	4			2.69 (2.01-3.59)	1.72 (1.28-2.33)
	5 (richest)			8.41 (5.85-12.11)	3.77 (2.47-5.76)
	Pseudo R^2			0.09	0.15
Met need for family planning	1 (poorest)			1	1
	2			1.53 (1.22-1.90)	1.50 (1.20-1.88)
	3	2000	8954	1.99 (1.59-2.49)	1.95 (1.55-2.44)
	4			2.12 (1.68-2.69)	2.09 (1.65-2.64)
	5 (richest)			3.93 (3.16-4.88)	3.65 (2.90-4.60)
	Pseudo R^2			0.03	0.08
	1 (poorest)			1	1
	2			1.17 (0.99-1.38)	1.13 (0.95-1.33)
	3	2005	9814	1.20 (1.03-1.41)	1.11 (0.94-1.30)
	4			1.52 (1.31-1.76)	1.33 (1.13-1.55)
	5 (richest)			2.71 (2.30-3.19)	2.22 (1.82-2.73)
	Pseudo R^2			0.02	0.04
	1 (poorest)			1	1
	2			1.16 (1.01-1.33)	1.17 (1.02-1.35)
	3	2010	11363	1.36 (1.19-1.57)	1.39 (1.20-1.60)
	4			1.30 (1.11-1.52)	1.36 (1.17-1.59)
	5 (richest)			1.58 (1.37-1.82)	1.64 (1.40-1.92)
	Pseudo R^2			0.01	0.05
Abortion with	1 (poorest)	2000	260	1	1
	2			2.70 (1.16-6.27)	2.70 (1.16-6.27)

skilled provider	3			2.18 (0.93-5.14)	2.18 (0.93-5.14)
	4			5.34 (2.08-13.76)	5.34 (2.08-13.76)
	5 (richest)			30.35 (3.91-235.86)	30.35 (3.91-235.86)
	Pseudo R^2			0.11	0.11
	1 (poorest)	2005	710	1	1
	2			1.76 (1.07-2.91)	1.76 (1.07-2.91)
	3			1.80 (1.09-2.96)	1.80 (1.09-2.96)
	4			3.78 (2.15-6.65)	3.78 (2.15-6.65)
	5 (richest)			5.87 (2.89-11.91)	5.87 (2.89-11.91)
	Pseudo R^2			0.05	0.05
	1 (poorest)	2010	813	1	1
	2			1.34 (0.78-2.31)	1.34 (0.78-2.31)
	3			1.55 (0.90-2.66)	1.55 (0.90-2.66)
	4			1.43 (0.87-2.36)	1.43 (0.87-2.36)
	5 (richest)			1.58 (0.97-2.58)	1.58 (0.97-2.58)
	Pseudo R^2			0.01	0.01
95% confidence intervals in parentheses					

CHAPTER 6 RESEARCH PAPER 2: EXPLORING IDENTIFICATION OF THE POOR IN CAMBODIA

This chapter comprises Research Paper 2, which addresses study objective 2 of the thesis by exploring poverty identification in Cambodia within the national ID Poor programme. Exploration of poverty identification in Cambodia is relevant to the aim of the thesis, as the literature reviews in Chapter 2 have illustrated that the population most disadvantaged in terms of reproductive and maternal health in developing countries are poor, uneducated and rural women. In order to overcome such inequity and improve the reproductive and maternal health of this group, for example by targeting subsidies or financial incentives to them, it is necessary to identify exactly who they are. As this paper elucidates, this is a challenging process in itself, with significant implications for the success of interventions utilising this means of identification of those most in need of support. It is planned for this paper to be submitted to Social Science and Medicine for publication.

RESEARCH PAPER 2

'YOU ARE RICH TODAY, YOU ARE POOR TOMORROW': EXPLORING CAMBODIA'S POVERTY IDENTIFICATION PROGRAMME WITH POOR AND NON-POOR VILLAGERS, PROGRAMME IMPLEMENTERS AND HEALTH SERVICE PROVIDERS IN KAMPONG THOM PROVINCE.

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RESEARCH PAPER COVER SHEET

PLEASE NOTE THAT A COVER SHEET MUST BE COMPLETED FOR EACH RESEARCH PAPER INCLUDED IN A THESIS.

SECTION A – Student Details

Student	Antonia Dingle
Principal Supervisor	Timothy Powell-Jackson
Thesis Title	Equity of access to reproductive and maternal health services – equity trends, poverty targeting and demand side financing

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion			
Have you retained the copyright for the work?*		Was the work subject to academic peer review?	

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Where is the work intended to be published?	Social Science and Medicine
Please list the paper's authors in the intended authorship order:	Antonia Dingle, Timothy Powell-Jackson, Ben Bellows, Catherine Goodman
Stage of publication	Not yet submitted

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary).	AD collected the data, conducted the analysis, and wrote the draft manuscript. BB, TPJ and CG provided input into the design of the study as well as the analysis, and reviewed all drafts of the paper. All authors approved the final manuscript.

Student Signature: _____ Date: _____

Supervisor Signature: _____Date: _____

6.1 Abstract

In the context of widespread user fees for health services throughout low- and middle-income countries, there is substantial debate regarding how to overcome the barriers such fees present for poor populations. Targeted subsidies or fee waivers have been proposed but they can be costly and high quality of targeting implementation is challenging to achieve. This paper explores rural Cambodians' experiences of poverty, and the accuracy and implementation of Cambodia's national poverty identification programme, the ID Poor. Data were collected from peri-urban and rural study sites randomly selected within Kampong Thom province. Study participants were purposively sampled across sub-groups comprising poor and non-poor women, service providers, individuals involved in poverty identification, and staff from programmes distributing health benefits to identified poor households. Semi-structured interviews were conducted with participants, and data were analysed using framework analysis. Participants within the sample held a range of perspectives on the ID Poor. Statements of satisfaction with the programme were common; however, criticisms of the system being unjust were also evident. There was widespread acknowledgement of inclusion and exclusion errors, across all sub-groups. Multiple reasons were given for errors, particularly lack of sensitivity of the identification tool to the current living standards of the poor; domestic and international migration; lack of coverage of the urban poor; corruption and nepotism of local authorities; and a mismatch between the frequency of movement above and below the poverty line and the frequency of poverty identification. Providing advance notification to households of future poverty assessment interviews, updating the targeting tool, and enabling more frequent/on-going assessments to take place could reduce the incidence of targeting errors within Cambodia's ID Poor. However there is a need for wider discussion of the value of individual targeting compared to geographic or categorical approaches.

6.2 Introduction

The wake of the structural adjustment era in the 1980s and 90s saw the introduction of user fees for health services throughout much of the developing world, and with it increased out of pocket spending and reduced access to healthcare particularly for poor, marginalised and vulnerable populations (Ensor, Tim et al., 2005; James et al., 2006; Meessen et al., 2006; Palmer et al., 2004). Over time agreement has developed acknowledging the negative impacts of such policies on healthcare utilisation, particularly by poorer groups, but consensus has not emerged regarding how this should be addressed (Gilson et al., 2005). This debate has at times become polarised, framed at one end by advocates of universal fee removal, and by proponents of targeted subsidies or fee waivers for the poor at the other (Mkandawire, 2005; Thomsen et al., 2011; Yates, 2009).

Universal fee removal has been argued to substantially reduce administration costs of service provision, and if the majority of the population are poor, may be the most efficient way to target this group (Barros, A et al., 2005; Meessen et al., 2006). User fee removal is also likely to be favoured by the general public and can garner political support. However, targeting subsidies to the poor through mechanisms such as vouchers, conditional cash transfers, equity funds, subsidised insurance or fee exemptions can ensure more accurate distribution of benefits to the most disadvantaged groups and can be more efficient if there is a large non-poor population. Targeted subsidies also serve to remind disadvantaged beneficiaries of their exemption entitlement and can stimulate service uptake. In addition, targeting has been argued as a practical step in a progressive, staggered strategy toward universal health coverage (Gwatkin, Davidson R et al., 2011). However, targeting has higher administrative cost than simply removing user fees, which may be unmerited in a predominantly poor setting (Meessen et al., 2006). Although ultimately this debate is concerned with equity

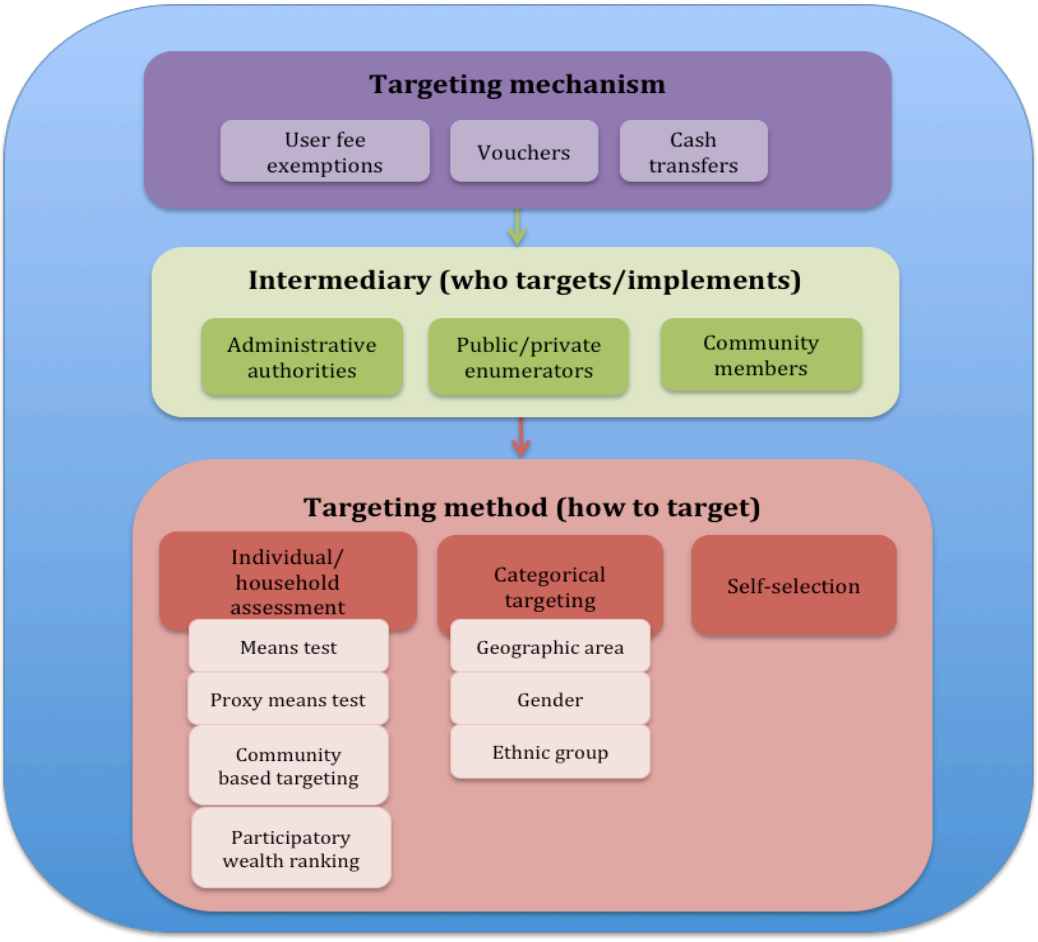
as well as efficiency; if targeting is poorly implemented it could potentially be less equitable than universal fee removal. As such, this debate is not merely conceptual but also has practical implications – implementation of either strategy will directly affect the well-being of beneficiaries, and insight into implementation successes and challenges will be valuable for social protection and health policy decision-making.

A distinction is evident in the literature between targeting *mechanisms*, the broader delivery system of targeting benefits, including the organisational design, intermediary agents or agencies to identify beneficiaries and channels of benefit delivery; and targeting *methods*, the specific tools used to identify beneficiaries (Figure 6.1). User fee exemptions, vouchers and cash transfers are examples of different targeting mechanisms. Types of intermediary agents used to identify beneficiaries include local authorities, health workers, or community members. Deciding how to target the poor is predicated on one's understanding of how to measure poverty, about which there is on-going debate. The spectrum of poverty measures comprises economic concepts of money-metric measures at one end, based on individual or household-level income and consumption, and more holistic concepts of education, health, psychological well being, and even group level factors like neighbourhood and social network characteristics, as key indicators of poverty and living standards at the other (Browning et al., 2003; Chakraborty et al., 2013; Sen, 1999). Furthermore, poverty can be measured in absolute or relative terms (Falkingham et al., 2002).

Targeting methods in LMICs include individual or case-based assessment such as proxy means testing (PMT), which is conducted at the household level using indicators such as assets as a proxy measure of poverty status, in lieu of more detailed information on consumption or expenditure, which is more difficult and time consuming to collect. Community based-targeting (CBT) is also conducted amongst individual households

but involves community members who collectively discuss the relative poverty status of households in their community based on their personal knowledge of families' situations and their own conceptualisations of what constitutes poor and non-poor. A more systematic individual targeting method also using community members is participatory wealth ranking (PWR), where community members rank all households in their community according to wealth status. Categorical targeting methods use easily observable characteristics such as geographic area or gender, whilst with self-selection the benefit is available to all, but is designed to be more attractive to the target population, so they opt-in to the scheme (Coady et al., 2004; Conning et al., 2002; Hanson et al., 2008). Combinations or hybrids of targeting methods are common (Alatas et al., 2010; Hanson et al., 2008).

Figure 6.1: Components of poverty targeting strategies



Critical to the issue of whether to target benefits is the effectiveness of targeting: is it accurately identifying those in need of support and delivering the benefits to those identified; and how much does the composition of groups in need of support versus those without need change over time?

When evaluating poverty targeting systems, the evidence tends to draw on incidence of exclusion and inclusion errors. Inclusion errors reflect the proportion of benefits going to the non-poor; exclusion errors comprise the proportion of the poor not accessing the benefit (Yazbeck et al., 2005). Comparing PMT and CBT methods in a randomised control trial in Indonesia, Alatas et al (2010) found that whilst targeting errors are fewer with PMT, CBT identifies more of the extreme poor and has more legitimacy within communities. The literature suggests that CBT can benefit from lower administration costs, better information for identifying the poor, less opportunity to provide false information and use of a local definition of deprivation. However, CBT may be subject to increased conflict within the community, and high opportunity costs for community leaders (Coady et al., 2004; Conning et al., 2002). A hybrid model is thought to help reduce the potential risk of local elite capture of CBT (Alatas et al., 2010). Conning and Kevane (2002) suggest that hybrid approaches to targeting are likely to achieve the best outcomes, as they balance community involvement with rules and guidelines for identifying the poor. Coady et al (2004) in a review of 85 targeting interventions, report that use of multiple targeting methods improves targeting performance, with each additional method associated with a 15% improvement in targeting (Coady et al., 2004).

6.2.1 The ID Poor Programme in Cambodia

Cambodia's ID Poor Programme is an example of a national mechanism aiming to target free services to the poor that has been operating since 2007. The Ministry of Planning (MOP) implements the programme with technical support from the German Development Agency, GIZ. The ID Poor aims to identify poor households in a way that achieves a good match with villagers' perceptions of who is poor (World Bank, 2012a), such that social programmes can target activities and resources to those most in need. The adoption of this national poverty screening system is intended to streamline and minimise the costly process of identifying beneficiaries that is otherwise repeated by each sector.

The ID Poor is used extensively in the health sector in Cambodia to target a range of benefits, with Health Equity Fund (HEF) operators one of the primary users. HEFs provide free or subsidised healthcare to the poor (identified by the ID Poor) at tertiary and increasingly at primary government health facilities (University Research Company, 2011b). The Vouchers for Reproductive Health Services (VRHS) Project also allocates vouchers to women with ID Poor cards to access a package of free safe motherhood, family planning and safe abortion services (EPOS Health Management, 2010). In addition, commodities such as mosquito nets, rice, blankets and containers are distributed to poor households using the ID Poor system.

The programme operates in a cyclical fashion across the country; every year screening households in approximately eight provinces, with each province screened every three to four years (Royal Government of Cambodia, 2011c). As of 2011 nearly all villages had undergone ID Poor poverty identification at least once since 2007.

Local village authorities compile a list of households in their village believed to be poor. Village representatives interview households on this list using a standardised tool to

ascertain their standard of living, including assessment of type and quality of housing, ownership of land and assets, and source of household income. The questionnaire score denotes their position above or below a national threshold specific to the tool. Household scores are compiled by village chiefs and a final list of poor households is shared publically. Subject to community verification of households on the list, ID Poor cards are issued to families identified as poor. The ID Poor would therefore be characterised as a hybrid poverty targeting model.

Studies estimating the accuracy of the ID Poor have produced varying results. Ir et al (2008) found inclusion errors of between 26-43% and exclusion errors of between 44-47% (Ir et al., 2008). An as yet unpublished study by the World Bank found 30% of very poor and poor households were excluded from the ID Poor (calculated using the ID Poor tool), and 13.5% of non-poor households were included. In addition, the study assessed accuracy of the ID Poor against consumption-based quintiles, the gold standard measure of poverty. Using a consumption-based poverty measurement they found 51% of the poorest quintile was excluded from the ID Poor, whilst 15% of the wealthiest quintile was erroneously included (World Bank, 2012a).

Whilst understanding the magnitude of error within targeting systems is important, it is also critical to understand how and why they perform poorly or well, with more focus on issues related to design and implementation, rather than just outcome (Coady et al., 2004; Hanson et al., 2008; Murray et al., 2014). Only then can we hope to improve the system. This paper addresses this gap in the literature in the context of Cambodia's ID Poor programme. To date, as far as we are aware, just one study has explored this issue qualitatively (Men et al., 2008). This paper must be caveated with the notion that such challenges are not unique to the Cambodian poverty identification system. Any system identifying the poor must weigh up requirements of accuracy

against available resources and time. Furthermore whatever method is selected to measure poverty will inevitably incur some error, particularly if different conceptualisations of what it means to be poor and therefore how this should be measured, are taken into account.

This paper explores rural Cambodians' experiences of poverty, and the accuracy and implementation of poverty identification in Cambodia, with intended beneficiaries, programme implementers and health service providers. Key findings are drawn from qualitative data gathered through semi-structured interviews conducted in the province of Kampong Thom.

6.3 Method

6.3.1 Study setting

Cambodia is one of the poorest countries in South-East Asia (World Bank, 2013b). 80% of the 14.8 million population is rural (National Institute of Statistics, 2008). However, Cambodia is experiencing remarkable economic growth (World Bank, 2013a). Growth, furthermore, that has been pro-poor. Based on estimates of household consumption, 21% of the population in 2011 was poor (24% of the rural population, 18% of the urban population), a reduction from 53% (59% of the rural population, and 56% of the urban population) in 2004 (World Bank, 2013a). Yet whilst a substantial proportion of the population have escaped poverty, they remain vulnerable, living just above the poverty line, where even a small economic shock risks pushing them back into poverty (World Bank, 2013a).

Substantial socio-economic disparities are evident across Cambodia's population. Table 6.1 details several socio-economic indicators by wealth quintile, showing that the poorest groups are less well educated, work in lower skilled industries, have a higher

total fertility rate and a greater proportion start childbearing whilst still a teenager. There is an indication of top inequality regarding distance to provincial hospitals and trained midwives, and also extent of indebtedness, with the wealthiest 20% of the population fairing very well against these indicators, and the rest of the population less so (NIPH et al., 2010; World Bank, 2009).

Table 6.1 Socio-economic characteristics by population wealth quintile, Cambodia

Indicator	Poorest	Next poorest	Middle	Next richest	Richest	Data source
Women with no education	31.5%	22.3%	14.9%	9.8%	4.8%	DHS 2010
Women with complete secondary education	0.6%	0.1%	1.7%	4.0%	9.8%	DHS 2010
Women employed in agriculture	85.8%	80.4%	68.8%	41.6%	6.0%	DHS 2010
Women employed in sales and services industry	5.9%	7.8%	14.2%	30.7%	50.7%	DHS 2010
Total fertility rate	4.5	3.3	3.0	2.7	2.1	DHS 2010
Started childbearing by age 15-19 years	13.3%	10.9%	9.1%	6.5%	4.0%	DHS 2010
Distance to provincial hospital	46.6kms	45.6kms	42.9kms	35.9kms	21.4kms	World Bank 2009
Distance to trained midwife	4.8kms	3.9kms	3.6kms	3.2kms	1.7kms	World Bank 2009
1+ outstanding loans	46.0%	49.9%	40.7%	36.2%	22.4%	World Bank 2009

Health service user fees were formalised in Cambodia in 1996 (Bitran et al., 2003). A fee waiver system was also introduced, although this was largely unsuccessful and rarely benefited the poor (Bitran et al., 2003). To combat shortcomings of the fee waiver policy, HEFs were introduced in 2000 to provide free healthcare at the point of service for the poor, for which health providers were reimbursed by a third party purchaser, usually national NGOs. Several studies have found that HEFs have increased use of services (Annear, PL et al., 2008; Hardeman et al., 2004; Noirhomme et al., 2007)

and reduced out of pocket spending on healthcare by the poor (Flores et al., 2013). However, whilst government spending on health is increasing in Cambodia, in 2008 two thirds of total health expenditure remained out of pocket (Ir et al., 2008).

The study is located in Kampong Thom, with a total population of 672,000 (National Committee for Sub-National Democratic Development (NCDD), 2009), 33% of which is poor, based on a national, relative poverty rate calculated using household socio-economic and demographic variables (Eng et al., 2010). Serving this population are two referral hospitals and 50 health clinics. The hospitals have six doctors between them and 26 midwives operate at the local and also referral level (National Committee for Sub-National Democratic Development (NCDD), 2009).

6.3.2 Sample selection

Data for this paper were collected as part of a larger study evaluating Cambodia's VRHS project (Bellows, Benjamin et al., 2011). A single study province was selected from the three provinces in which VRHS was operating, using selection criteria comprising demographic, health worker coverage, voucher distribution and voucher up-take data. Using equal weighting across criteria, the middle ranking province overall was selected as the study province – Kampong Thom. One rural and one peri-urban commune (on the fringes of the urban provincial capital) were randomly selected within Kampong Thom. Distinctions between rural and peri-urban areas were based on classifications used by VRHS. Two different types of research site were use in the study to allow for exploration of differences in experiences of the programmes under study within rural and peri-urban areas respectively. Literature reviews conducted for the PhD and the theoretical frameworks on which the thesis draws identify rural/urban location as an important factor in determining use of reproductive and maternal health services. Therefore it was perceived to be a worthy dimension to capture within the study

design. Each commune comprises several villages, all numbered within a national system. The first numbered village in the rural and peri-urban communes respectively were selected as the study sites.

Study participants were purposively sampled across six sub-groups, chosen to provide a breadth of perspectives on the ID Poor and VRHS programmes (Figure 6.2). Details of poor households from the latest round of the ID Poor in Kampong Thom, conducted in 2009, were obtained and all women of reproductive age selected. This list of women was matched with details of women who had received and/or used safe motherhood and family planning vouchers from VRHS. From this, those who had used and not used their voucher were identified. This sampling frame was used to randomly select participants in each site for the first three sub-groups – poor women who had neither received nor used a voucher (NN); poor women who had received but not used a voucher (RN); and poor women who had received and used a voucher (RU). Approximately three women per sub-group per site were selected from the sampling frame. A fourth sub-group of participants was also created, non-poor women (NP), with approximately three sampled per research site. Programme implementers comprised the fifth sub-group of participants, including staff from the VRHS project, the ID Poor, and the HEFs. These participants included top, middle and lower level staff from these programmes, for example senior executive team members, provincial managers and village based voucher Health service providers in rural and peri-urban sites were purposively sampled and recruited as a sixth sub-group of participants. Health service providers were a mix of primary and secondary midwives working in village health centres, and one doctor working in the private reproductive health clinic in Kampong Thom town.

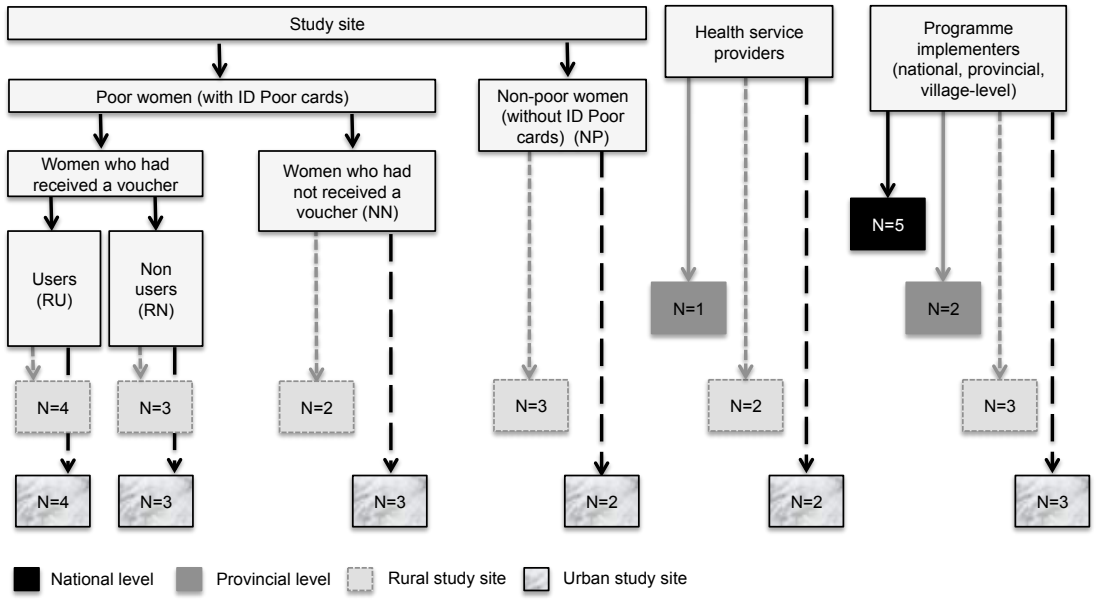


Figure 6.2: Data collection sampling frame

The women sampled for the study had some similarities; they were between their early twenties and late thirties in age, most had between one and four children, with older women having more children, one older very poor woman had 7 children. Many of the women (poor and non-poor) worked in farming, either farming other people's land or their own if they had it, or looking after cattle. Non-poor women were engaged in employment providing higher income than poorer women, such as running their own shop in the market, making and selling palm oil and palm sugar, making and selling food and drinks in their villages. Proximity to the highway in the peri-urban site provided more opportunities for daily labouring – many of the women had husbands who worked as masons, carving stone statues at the workshops along the highway. One woman also worked in a nearby brick factory. There seemed to be more and varied opportunities for unskilled labour in the peri-urban compared to rural study sites. Poorer households in the peri-urban site also seemed to be slightly better off than poor households in the rural site – slightly more possessions within the house, for example, and fewer houses made of only very basic bamboo. Most women had some

years of education although most had not completed primary education and very few had completed secondary education.

6.3.3 Data collection and management

42 participants were included in the study, with data gathered through individual semi-structured interviews conducted between June and October 2012. One woman in the rural NN sub-group (not included in the final count of included participants) was approached to be included in the study and did not agree to participate. Topic guides were developed, piloted and refined before data collection commenced, and further refined during the process of data gathering, as necessary. Seven interviews were conducted in English, 35 in Khmer. Khmer-language interviews were conducted with an experienced female Khmer interpreter who consecutively translated the discussion from Khmer to English.

Ethical approval for the study was granted by the Cambodian National Ethics Committee for Health Research, and by the London School of Hygiene and Tropical Medicine. Interviews were conducted in a private space wherever possible, usually in participants' homes or offices. Written informed consent was gained from all study participants prior to data gathering, and specifically for digitally recording interviews. Hand written notes were also made during the interviews. Audio recordings of interviews were transcribed, and Khmer transcriptions then translated into English.

6.3.4 Analysis

Data were coded in QSR International NVivo 10. A coding scheme was developed using a hybrid inductive-deductive approach, with themes and codes developed partly through reading and re-reading the data, and partly based on a pre-existing conceptual framework (Bradley et al., 2007; Fereday et al., 2006). The initial coding scheme was

piloted in a sample of transcripts from across participant sub-groups, reviewed and refined until no new codes emerged from the data, before being applied to all data. In developing the coding scheme, one transcript was co-coded by a colleague outside the research team to enable discussion about coding, provide additional insight and refinement to the process, and improve reliability of the analysis.

A framework analysis approach was used whereby data were extracted from coded transcripts to populate thematic charts based on each central theme within the data (Ritchie et al., 2003). Key dimensions within sub-themes were identified, summarised and interpreted into categories. Categories were then grouped where relevant to produce an overview of the data within each sub-theme. As themes emerged, data were crosschecked across sub-groups of participants to look for consistency and/or differences of opinion on issues. Categories within sub-themes were considered and re-organised to tell the main stories emerging from the data. Once established, the themes and findings were discussed with the Khmer interpreter present throughout the data gathering, to triangulate the interpretation of the data and to ensure it was true to the discussions undertaken during data gathering.

To validate preliminary findings, the research team returned to all participants and discussed findings, either individually, or in a group setting for villagers, and provided an opportunity for participants to comment on whether our interpretation of the data was accurate, and reflected their experiences of the issues under study (Green et al., 2005; Pope et al., 2006; Reynolds et al., 2011). Comments from participants were incorporated into subsequent stages of analysis.

6.4 Results

The results begin with a brief exploration of the issue of poverty in Cambodia, how it is experienced and understood. This is insightful as there are may to be differences between how the ID Poor defines and understands poverty in Cambodia, and how it is understood by communities themselves. Understanding the extent of any divergence on this topic is likely to have implications for how successfully the ID Poor identifies the poor. This is followed by analysis of overall perspectives on the ID Poor. The reasons for these perspectives are then examined, focusing on identification errors.

6.4.1 Perceptions of poverty

Four 'social classes' were discernible from discussions with poor and non-poor participants about poverty in Cambodia. There was a general consensus across all groups of participants that the social structure of participants' communities comprises the extreme poor, the poor, the average or middle class, and the rich. The extreme poor have nothing at all, no property, no ability to borrow and no one to ask for help. The poor do not have very much, possibly a small piece of land, or a cow, they have some means of borrowing, some assets to secure against a loan if necessary; however, they are considered to be 'underfed'. By comparison the average have just enough, including enough to eat, yet they are distinct from the rich, who are 'well fed' and 'can do whatever they want'.

"*The poor can make a little money for living, they have some rice to eat; the extreme poor can't make anything at all… they can't borrow from anyone*." (Rural RN).

Differences in living standards and quality of life between the poor and average are perceived to be very slight, whilst the difference between the poor and rich is substantially starker.

The poor (including the extreme poor) predominantly work as casual labourers on farms or rice paddies, in construction or making bricks. Most poor participants have only a few years of education, up to grade three or four. Several recall leaving formal education to support their family in the event of an illness or death of a parent. The portrayal is one of survival, living hand to mouth, day by day, earning enough in one day to eat just for that day.

"*We have just enough food to survive like chickens!*" (Rural RN).

The inability to save money was a recurring feature of poverty, mentioned by poor participants themselves. Lack of rice fields was a critical constraint, necessitating the daily purchase of rice, rather than being able to grow their own rice to eat. The poor also lacked many other assets, for example good quality, secure housing, cattle, and means of transport. Debt was a common aspect of poverty, along with a sense of unhappiness, a lack of freedom and hope.

"*What can be changed about the poor?!*" (Rural NN).

"*I am kind of hopeless about getting a better house. I don't have great hopes for my children either. I can't predict* [the future] *so I dare not hope in advance.*" (Peri-urban RU).

6.4.2 Identifying the poor

Participants held a spectrum of perspectives on the ID Poor system. Some were content with the process, suggesting it was fair, some did not feel it was their role to

have an opinion on the system, whilst others stated that it was unjust and were dissatisfied with it. A national level programme implementer commented:

"*It is unusual to have a developing country with such a systematic approach* [to poverty identification], *where it is not all different organisations doing separate poverty measurements, to come up with their own targeting mechanisms*" (National level programme implementer).

Dissatisfaction with the ID Poor was largely linked to the perception of inclusion and exclusion errors within the system, which were widely acknowledged across all groups of participants. Several participants who gave a positive initial response about the ID Poor went on to describe errors within it. Approximately two-thirds of participants commented on inclusion errors, from across all sub-groups sampled, in both rural and peri-urban study sites. Perceptions of exclusion errors were similarly extensive. Two programme implementers cited two studies of accuracy of the ID Poor, which found between 50-70% of the poor did not have an ID Poor card, whilst significant numbers of non-poor had cards. One of these studies, conducted by the World Bank, has been refused authorisation for publication by the Ministry of Planning (MOP). Some participants were not bothered about the presence of these errors, whilst others were disappointed or even angered by them.

"*I don't think anything about the card. If they don't think of me and don't give me the card, I just try to make a living on my own*." (Rural NP)

6.4.3 Reasons for identification errors

The following section discusses six reasons for identification errors: inadequacies of the identification tool itself, domestic and international migration, exclusion of the

urban poor, corruption, changes in poverty status and the system of checks intended to limit errors.

The identification tool

Three issues emerged regarding the link between the identification tool and identification errors, suggested by participants within the Programme Implementers sub-group: the type of indicators included; the precision of the tool; and training on the tool provided to interviewers. One programme implementer commented strongly that the questionnaire used by the ID Poor needed updating to reflect genuine asset ownership (or lack of) by the poor, and to avoid unnecessary exclusions.

"*[*The questionnaire*] says if you have a mobile phone, then you are not poor, but in Cambodia everyone has a mobile phone, they are very cheap*" (National level programme implementer).

Indebtedness is currently not accounted for within the ID Poor questionnaire, which led one programme implementer to suggest that this risks overlooking a common burden for many poor households.

"*Some people have farming equipment like tractors, but they may have borrowed this from someone else, or they might have a new motorbike but they have borrowed money to buy it, so they are in a lot of debt to the bank. The ID Poor needs to be more detailed to judge carefully who is poor or not*" (National level programme implementer).

An ID Poor programme implementer from the MOP explained that reliance on villagers administering the ID Poor questionnaires necessitated a balance between the precision

of the tool (for example how detailed it is, the type of data collected at the interview), and its ease of use.

"*We rely on local people to do interviews, not trained enumerators… [*The questionnaire*] has to be clear and simple, we can't complicate it too much. That is a bit of a dilemma, we want it accurate and technical but it also has to be doable and feasible*" (National level programme implementer).

A village representative group (VRG) member who conducted the interviews commented that he thought the training provided to the VRG was insufficient:

"Next time village representatives and supervisors should be well trained. Supervisors are like a commander who serves on the front line, so if they don't understand the questions clearly enough the interviewers will encounter difficulties" (Peri-urban programme implementer).

Domestic and international migration

Almost a third of participants from rural and peri-urban sites, poor and non-poor women as well as programme implementers, mentioned migration as a leading cause of exclusion errors within the ID Poor. Migration is a common facet of life in provincial Cambodia.

"*Now this place is quiet, there are very few people at home, many go away to work*" (Rural NN).

Those who were away when the ID Poor interviews were conducted missed the opportunity to receive a card.

*"My niece doesn't have [*the ID Poor card*]. [*Her and her husband*] were busy working in Thailand when they did the interviews so they didn't get the card*." (Peri-urban NN)

*"I was busy working in [*another province*]. I didn't know they were coming to interview people... When I came back someone told me about it, but it had already happened so I didn't get [*an ID Poor card*]... I feel disappointed that they came to interview people but didn't interview me... It's difficult when we are sick and don't have the card."* (Peri-urban RN)

The absence of potential interviewees due to migration was also a challenge for VRG members conducting the ID Poor interviews. They said they often had to return several times to households hoping residents were available for interview. VRG members are compensated for their time per interview conducted; time and petrol used visiting a household which does not result in an interview, are not compensated.

"*Working for the sake of the poor is not easy. After some time you become poor yourself! When we go to meet them they are not at home, if we go two times sometimes they are still not there... Poor people are not normally at home*." (Peri-urban programme implementer)

The urban poor

At the time of data collection urban poor in Cambodia are excluded from the ID Poor; identification is conducted only in areas outside of Phnom Penh and the provincial towns. One programme implementer comments:

"*The urban poor is a big yawning gap until now not addressed by ID Poor*" (National level programme implementer).

However, a participant working with the MOP on ID Poor noted the challenges involved:

"It's of high political relevance to also capture the urban poor where more people live…The big challenge is developing a tool for urban areas…You can't just transpose the rural process and tools onto urban areas, we have completely different social structures and institutions. The community validation will be hard to do in a city, as people barely know each other, there's a lot of transition, people come and go and move. So that will be very difficult" (National level programme implementer).

Corruption

A fifth of participants commented on the corrupt practices of village authorities, specifically village chiefs, as causing both inclusion and exclusion errors. The perception amongst these participants was that village chiefs give ID Poor cards to their relatives or people in their 'network'.

"*Some rich people also got the cards. The village chief chooses them, they are his relatives*" (Peri-urban RU).

"*Those people in that big house also got the card - they even have a motorbike and a business at the market! They might have networks - the village chief is their sibling or relative and can help them*" (Rural RU).

Participants who commented on local corruption as a reason for inclusion errors were from a range of sub-groups – peri-urban and rural, poor and non-poor, and one service provider. Two participants, one rural woman and one programme implementer in the rural study site, also suggested that exclusions from the ID Poor card were due to the village chief not listing certain poor households for interview. In a similar vein, one VRG member suggested a potential cap on the number of ID Poor interviews conducted was in effect.

"*The village chief and I made a list of all the poor households in the village, 310 in total. But we weren't allowed to interview all these people, we interviewed 100 poor households*" (Peri-urban programme implementer).

Whilst comments were made about such corrupt practices, there was also a strong sense amongst participants that village chiefs know well who is poor and it is their role and authority to select the poor for interview. Some indicated trepidation about questioning this role.

"*We are civilians. It's up to the village chief. We don't dare to protest*" (Peri-urban RN).

Some programme implementers expressed concern with rumours of village chiefs extracting bribes (*sakun*) from poor households to receive their ID Poor cards. However, none of the interviewees reported direct experience of such practices.

Changes in poverty status

Approximately a quarter of participants attributed inclusion errors to changes in poverty status of households over time. Such comments were made by both rural and peri-urban women, and programme implementers, although mainly by those from peri-

urban areas. Several participants, all programme implementers, also suggested *ex*clusion errors to be due to changes in poverty status; non-poor households at the time of interview subsequently become poor but were already classified as "non-poor" by the ID Poor system. As noted above, several participants commented that whilst the difference in living standards between rich and poor is substantial, the difference between average and poor is minimal. The social and economic situation of many rural Cambodians is somewhat fragile and fluid; households fluctuate in and out of poverty, some on a seasonal basis. However, these dynamics cannot be detected by a poverty identification system that updates households' status every 3-4 years. This therefore caused identification errors.

"*You are rich today, you are poor tomorrow!*" (National level programme implementer).

"*Now they are poor, but tomorrow we are not sure if they are poor. Sometimes they can get money, support from outside. Sometimes they become poor, sometimes they become rich*" (Provincial level programme implementer).

"*Some houses when I went to interview them, they were poor, but now their children are grown up and so help them, now they earn more and build a bigger house, some have a good house, jewellery, motorbike, now they have everything.*" (Peri-urban RN).

A related phenomenon was the commonly reported experience of envy towards the poor from the non-poor because of ownership of an ID Poor card. More than half of the poor participants in the sample reported that non-poor residents in their community were jealous of their possession of the ID Poor card. Jealousy was more commonly reported amongst rural participants than peri-urban, although one peri-urban non-poor participant also acknowledged that this occurs.

"*Some non-poor people say they are equally as poor as us but don't get any support, but these people aren't really poor, they are average, they have enough. Some people were jealous of my card, they want to know why they don't also get one*" (Rural RU)

Checks to limit identification errors

The poverty identification process is designed such that community members are invited to comment on the list of households found to be poor, following the interviews. This community verification component is intended to act as a check against errors within the system. If non-poor households appear on the list of those given the cards, or if poor houses are omitted from the list, it is hoped that communities will raise these errors and request amendments to the list. The perception of such extensive errors within our sample implies that this check may not be functioning as planned. Three out of four VRG members (all from the programme implementer sub-group) commented that a meeting was held with community members to discuss the list, or the list was posted in public. However, one of these participants stated:

"*People didn't respond to our invite [*to come and comment on the poor list*]*" (Peri-urban programme implementer).

Another VRG member concluded that as no complaints were made after the list was posted in public, the system was fair. However, a lack of complaints does not directly equate to complete satisfaction within the community; it could reflect fear or disinclination to make a complaint in a public setting. Apprehension of complaining to village chiefs has been noted above.

Several programme implementers also commented on the challenge of dealing with incidences of suspected lying about assets during the ID Poor interview, for example if people hide assets they suspect will count against them in the assessment. The community verification process should serve to overcome this type of behaviour; however, its presence suggested community verification of identified poor households was not functioning as intended.

"*Sometimes people don't tell you honestly. We have to make our own judgement, but it is difficult when people don't tell the truth. It is difficult if people have the same living standard as their neighbour, one tells you honestly and one doesn't, one can pass and one can fail [*the interview*]. The one who fails envies the one who passes"* (Rural programme implementer).

A participant working at the national level on the ID Poor acknowledged that there was a need to strengthen the community validation element of the ID Poor, to develop a complaints system, and to raise people's awareness of their rights within the identification process, as checks against corruption.

6.5 Discussion

Participants within the sample held a range of perspectives of the ID Poor. Statements of satisfaction with the programme were common; however, criticisms of the system being unjust were also evident. The fact that several individuals stated their satisfaction with the programme, but later described identification errors, may indicate that whilst people are aware of errors within the system, there is some degree of acceptance. Other studies have also found high levels of satisfaction with poverty targeting systems despite evidence of extensive targeting errors; participatory targeting methods tend to garner more acceptance and satisfaction amongst

communites whilst also being less accurate than some other methods (Alatas et al., 2010; Ridde, V, Haddad, et al., 2010; World Bank, 2012a).

There was widespread acknowledgement of both inclusion and exclusion errors, across all sub-groups in the sample. Multiple reasons were given for the presence of errors, particularly lack of sensitivity of the identification tool to the current living standard of the poor; domestic and international migration; lack of coverage of the urban poor; corruption and nepotism of local authorities; and a mismatch between the frequency of movement above and below the poverty line and the frequency of poverty identification. Other studies have also found migration (Ir et al., 2008; Men et al., 2008), changes in poverty status (Ir et al., 2008), and corruption and nepotism of village chiefs (Men et al., 2008) as key explanations for poverty identification errors in Cambodia. This study suggests that these issues have not been resolved in the six years since these initial studies were published, it also contributes additional analysis regarding the type of targeting methods used within the ID Poor and the potential gains that could be made through use of alternative methods.

There was limited evidence that the community verification component of the ID Poor was operating effectively, with programme implementers acknowledging that this needs strengthening and monitoring. This latter finding supports the World Bank (2012) who report some evidence of local capture by elites administering the ID Poor (World Bank, 2012a).

The ID Poor comprises a hybrid individual poverty targeting method, combining a PMT with CBT. The literature suggests that such hybrid methods should reduce the risk of elite capture that can occur with a purely CBT method; however, our study still found some evidence of elite capture of the ID Poor (Alatas et al., 2010; Coady et al., 2004;

Conning et al., 2002). Coady et al (2004) state that PMT is insensitive to quick changes in welfare, yet more frequent recertification of poverty status is costly. This can be seen in Cambodia where changes in socio-economic status since the last ID Poor interviews are reported as an important reason for inclusion and exclusion errors.

Ir et al (2008) also interestingly report that similar proportions of poor and non-poor households were found to have had at least one day in the last 12 months without enough to eat (81% and 68%); to be carrying debts (71% and 64%) and to have sold assets to pay for healthcare in the last 12 months (12% and 16%) (Ir et al., 2008). The World Bank states that although poverty overall is reducing dramatically in Cambodia, the former poor are largely shifting to become 'vulnerable households', living just above the poverty line, such that a minor economic shock could tip them back into poverty (World Bank, 2013a). This supports the notion that there is little difference in living standards between the poor and the majority of households in rural areas, particularly for those close to the poverty line, elucidating the ease of fluctuation in and out of poverty. Indeed, Thorbecke (2004) cites increasing evidence that transient poverty (regular movement in and out of poverty) is significantly greater than chronic poverty in much of the developing world (Thorbecke, 2004). Furthermore it lends weight to the argument that households in need could potentially be more cheaply and easily targeted if health services were made free for all users. We return to this issue below.

Coady et al (2004) find that differences in targeting methods only account for 20% of variance in allocation of benefits to the poorest compared to universal benefit distribution. Country characteristics, including GDP per capita, inequality and extent of societal 'voice' and government accountability can also be explanatory factors (Coady et al., 2004). As such the problems related to targeting errors within the ID Poor are

unlikely to be purely explained by the targeting method, but also due to the economic, social and political environment in which the strategy is implemented.

Furthermore, in considering accuracy of poverty targeting, exclusion and inclusion errors are understood to be inversely linked, such that attempts to reduce the incidence of one, can inadvertently increase the incidence of the other, for example adopting less restrictive criteria to reduce exclusion of the poor can also include more of the non-poor (Coady et al., 2004; Mkandawire, 2005). In reviewing targeting performance some level of error is foreseeable, and of key concern is what levels of inclusion and exclusion errors policy-makers and communities can tolerate, rather than how to design a system that will be completely error-free, as well as the costs related to different designs. The findings from this study suggest that there is a degree of tolerance of identification errors amongst communities.

6.5.1 Study limitations

Several limitations to the study are important to highlight. Time and resource constraints made it unfeasible to conduct data collection in more than two communities in one study province. However, importance was placed on selecting an 'average' province from amongst the three VRHS provinces, such that findings may be as applicable as possible to other VRHS provinces. Furthermore, as a standardised approach to the ID Poor is implemented in Cambodia, our findings should be relevant for provinces across the country.

We were unable to sample households with ID Poor cards that were the result of an inclusion error (household wrongly classified as poor). Our participants, whilst willing to acknowledge that they knew people in this situation, were unwilling to specify exactly who these individuals were. It is well known within our study communities

that ID Poor cards are intended only for poor households, therefore it is logical to expect that non-poor households in possession of an ID Poor card are unlikely to respond to invitations to participate in the study.

The working language in Cambodia is Khmer. As a non-Khmer speaker the principal investigator was reliant on a Khmer research assistant/translator to translate topic guides, facilitate and translate interviews, and assist with initial data analysis. Careful consideration was taken when recruiting a translator to ensure they were experienced, had proficient English language capabilities, and a good understanding of the broader field of reproductive and maternal health in Cambodia. Once recruited the principal investigator worked closely with them to ensure they understood the study objectives, provided them with direction regarding data generation, and facilitated opportunities for practice and feedback through pilot interviews. Simultaneous translation was used in interviews to ensure the principal investigator could follow discussions as closely as possible. Quality control of translation and transcription of the data was entrusted to the translator who conducted the data collection, and to an additional very experienced translator who worked alongside research assistants.

As qualitative researchers it is important to acknowledge our part in the study process. Our presence during data gathering and assumptions during data analysis may have impacted on the study outcomes. We attempted to limit this as much as possible. The principal investigator and translator who gathered the data were both female, something we considered important when discussing issues related to reproductive and maternal health, which occurred alongside discussion of the ID Poor. During the interviews most participants seemed relaxed and open to discussion with the research team; some behaved in a confiding manner, lowering their voices to discuss sensitive issues such as corruption within the village. Whilst it is possible that the presence of a

foreign researcher hindered participants' inclination to be open during discussions, it is equally possible that participants felt more open than with a Khmer researcher. During data analysis, the principal investigator remained cognisant of the possible influence of their presence on the interview discussions (Green et al., 2005; Kuper et al., 2008; Pope et al., 2006; Reynolds et al., 2011).

6.5.2 Policy implications

A key factor identified as causing exclusion errors for the ID Poor was that individuals are away from their homes working either elsewhere in Cambodia, or abroad, at the time of the interviews. Providing villagers with sufficient advance notice of future rounds of identification would be a very simple, but potentially highly effective way to ensure that more poor households are available for interview and therefore to reduce exclusions. Updating the ID Poor questionnaire to reflect more closely current living standards of poor and non-poor in rural Cambodia, as well as ensuring VRG members have sufficient training and proficiency in implementing it, are also highly recommended as 'quick wins' to improve targeting performance and reduce errors. It would be beneficial for future rounds of the ID Poor to focus on complaint resolution mechanisms, and also distribution of information to and direct communication with villagers. Finally, strengthened monitoring of ID Poor implementation, particularly of components involving community verification, would help to ensure that the ID Poor functions more closely as per the original design.

Frequent change in poverty status of households was a common explanation for inclusion and exclusion errors. The key problem seemed to be that household poverty status changes more quickly than the rate of poverty identification. One way to overcome this would be to implement poverty identification more frequently than the current three to four year cycle, however this has significant cost implications.

Therefore, whilst it may be unfeasible in terms of cost to repeat the whole identification process more regularly, shifting to an on-going process of identification may be feasible, if local authorities were notified by village representatives of changes in household poverty status, and if interviews and updates to the poverty database were conducted on an on-going basis. Not only would this make the system more responsive to the dynamic nature of poverty in Cambodia, it would also even the workload for local authorities, providing a small, continual stream of identification work, rather than an exhaustive amount of work once every few years.

Ultimately our interest in studying the ID Poor system is not just the targeting mechanism in itself, but the impact that targeting has on allocation of benefits, particularly access to free or subsidised healthcare that is made available to households with ID Poor cards in Cambodia. As discussed above, we found evidence of a fine line between the living standards of poor and average non-poor households (particularly those living close to the poverty line) in Kampong Thom, and this is supported by recent national poverty analysis (World Bank, 2013a). Furthermore, data collected at the same time as discussions of the ID Poor indicate that public health facilities are predominantly used by poor or average households in Kampong Thom, as opposed to the rich. The latter instead opt for private services.

Given this, it may be cheaper and easier to target those most in need (the poor and near poor) by a categorical (e.g. geographic) targeting method, rather than the individual assessment method utilised by the ID Poor. This links to debate regarding what poverty threshold is used in poverty targeting and the impact that the threshold has on estimates of poverty incidence (Acosta et al., 2011). If, for the purposes of the ID Poor, the threshold were raised to include households who remain extremely vulnerable, the 'near poor', this would increase poverty incidence across Cambodia. Whilst not

politically popular, the literature suggests that where poverty incidence is widespread, the most appropriate and efficient mechanism of poverty targeting is categorical targeting, such as identifying all households within the poorest districts as eligible for benefits (Acosta et al., 2011; Aryeetey et al., 2012; Meessen et al., 2006). We know from discussions with facility staff that the few rich residents in these areas would be likely to self-select out of the available free services, given their preference for private services. It has been found in other settings of high poverty incidence that the cost of including benefits for non-poor households under a geographically targeted intervention is less than the survey costs of using an individual targeting method (Aryeetey et al., 2012).

The significance of the performance of the ID Poor is ultimately its provision of access for identified poor households to critical health services, including specifically for reproductive and maternal health, through mechanisms such as health equity funds (HEFs) and vouchers, as well as to interventions in other social sectors. Evidence has shown that HEFs have a positive impact on health service utilisation, and that vouchers specifically have the potential to improve uptake of reproductive and maternal health services, with additional knock-on benefits for financial protection (Bellows, Nicole M et al., 2010; Hardeman et al., 2004; Ir et al., 2010b; Noirhomme et al., 2007; Poel et al., 2014; Witter et al., 2012). A more accurately or alternatively targeted system would serve to bring these crucial benefits to a wider population who are in need, and may contribute to lifting them out of poverty (Kraybill et al., 2006; Poel et al., 2014).

Future research would benefit from a qualitative exploration of different targeting strategies, for example by implementing different approaches at the commune or district level for the purposes of comparison, to improve our understanding of how and why there are variations in performance.

6.6 Conclusion

This qualitative exploration of Cambodia's ID Poor programme provides insight into the reasons behind inclusion and exclusion errors in identifying the poor in Kampong Thom province. Multiple factors contributed to identification errors including needing to revise the identification tool, migration, frequency of movement above and below the poverty line, and elite capture of the identification process. Whilst an error-free targeting system is unrealistic, recommendations have been made which could reduce the incidence of targeting errors. However, the nature of the causes of identification errors in the ID Poor, coupled with the evident similarity in living standards between the poor, near poor and the average in rural Cambodia, necessitates wider discussion of the value of individual targeting compared to geographic or categorical approaches, with consideration of the health, and in turn socio-economic, benefits this could achieve for the population that remain in need of support.

CHAPTER 7 RESEARCH PAPER 3: INVESTIGATING LOW UPTAKE OF REPRODUCTIVE AND MATERNAL HEALTH VOUCHERS IN CAMBODIA

This chapter presents research paper 3, which addresses study objective 3 of the thesis, to explore low uptake of vouchers within the Vouchers for Reproductive Health Services (VRHS) project in Cambodia. Supplementary results and discussion not included in the paper but which provide interesting background and context to the findings discussed in the paper are presented before Research Paper 3, in section 7.1. The findings in the paper contribute to the thesis aim by investigating a demand side financing mechanism with the potential to improve reproductive and maternal health equity, by targeting free services to poor women. The paper provides context and insight into the trends in health equity identified in Research Paper 1, enabling a more detailed understanding of why improvements in reproductive and maternal health for the poorest women may have occurred over the last decade. In addition it builds on the findings from Research Paper 2, as VRHS uses the ID Poor to allocate vouchers to poor women. Therefore, some of the challenges identified in Research Paper 2 regarding implementation of the ID Poor also impact on VRHS. It is planned for the paper to be submitted to the Health Services Research journal for publication.

7.1 Results paper 3 Supplementary results and discussion

In addition to the analysis discussed in Research Paper 3, the qualitative data gathered about VRHS provided some further interesting insights, which were not able to be included in the paper and so are presented here.

Results

The analysis uncovered some clear trends in attitudes and practices that provide useful context for the discussion regarding uptake of vouchers and implementation of the project.

Socio-political context of voucher implementation

The voucher implementation environment is relevant when considering potential impact of the VRHS project, given the wealth of factors beyond the vouchers themselves that could have contributed to voucher uptake. Three such factors are discussed here that became prominent during data analysis – preferences for modern maternal health services, burgeoning health awareness and supply side health policy changes.

Shifting preferences away from traditional maternal health practices

In Kampong Thom two factors were particularly of note regarding a reduction in the value placed on use of traditional maternal health practices. Firstly, there was evidence of a general shift towards greater use of modern maternal health services and a reduction in the reliance on the home-based care of traditional birth attendants (TBAs), amongst poor and non-poor women.

"*In the past people never went to a health facility to deliver their babies*" (Rural Woman_RN)

"*We all used to give birth at home until around the year 2000 when we knew we could then give birth at the health centre*" (Peri-urban Woman_NP)

Part of this shift also included a decreasing preference for traditional maternal health practices formerly common in Khmer culture, such as consumption of herbs during pregnancy to ease delivery, and use of *ang pleurng*[5] or lying over fire after delivery. Practicing *ang pleurng* immediately after birth was described by just under one third of women, in rural and peri-urban areas and including the non-poor, as a process to heat the veins of the new mother and thereby strengthen her following the tiring process of childbirth, to ensure a prompt return to good health and to (typically physically demanding) work. Discussing their most recent births, or those occurring within approximately the last five years, women more frequently mentioned the use of energy-boosting injections, often administered by a local, private *bpairt*[6] who attends to them at home, believed to produce the same effect as *ang pleurng*, but more quickly, involving less discomfort, which is becoming increasingly preferable. Four peri-urban participants, poor and non poor, mentioned the use of injections as an alternative to *ang pleurng*.

"*I used* ang pleurng *for three or four days [after having a baby], it makes my skin itchy! It wasn't comfortable.* Ang pleurng *makes our veins good. Nowadays we use a drug instead, but the elders practised* ang pleurng." (Peri-urban Woman_RN)

"I used ang pleurng *after delivering at the health centre. We put two fires under the bed, one at the foot and one at the head. You lay on there 24 hours a day.* Ang pleurng *helps*

[5] A traditional practice where women lie on a bed heated underneath by buckets of burning charcoal for several days immediately after delivery, colloquially referred to as 'roasting'.

[6] *Bpairt* (pronounced 'paet') is the Khmer word used to refer to all types of medical practitioner – doctors, midwives, nurses, TBAs, untrained drug vendors and private service providers.

make our veins strong so when we work we don't get sick. All women do like this. Although now most go to deliver at the health centre and when they come home they don't do ang pleurng*, they use drugs instead, the* bpairt *comes to give them an injection at home. It is an injection to make you warm, the mother has just had a baby and can't be cold."* (Peri-urban Woman_RU)

Secondly, and linked to the point above, there was a perceptible change in perspectives of the quality of TBAs. Three rural women, poor and non-poor, reported negative experiences of home deliveries with TBAs where, for example, they were unable to stitch vaginal tears endured during the delivery, resulting in having to clean open wounds daily to help them to heal. Women also commented on ineffective cleaning of the uterus (referring to removal of the placenta) by TBAs. Just under half of all rural women perceived TBAs as less skilled than health centre midwives and staff.

"*I delivered my second baby at the health centre as after my first I wasn't stitched properly and it was difficult to do heavy work. After my second baby I had no problems with that at all... I would deliver at the health centre again as you have less bleeding after the delivery… just for about a week. With home delivery you bleed for about a month afterwards. TBA does not clean all the blood from the womb afterwards and lets it flow out by itself.*" (Rural Woman_RN).

Burgeoning health awareness

There was evidence amongst both poor and non-poor women of an understanding of the importance of using maternal health services, awareness of dangers and complications surrounding labour and pregnancy, of the health and position of the baby and their own health as expectant mothers, and that these factors influenced use of maternal health services.

"*I went for ANC to have good health and for my baby to have good health. The NGO came to tell us that when you are pregnant, you should go to the health centre for ANC.*" (Peri-urban Woman_RN).

Just under a third of poor participants, both peri-urban and rural, expressed an understanding of the importance of limiting and spacing their children to provide time to work and earn money. They acknowledged that poor people have more children and that it is difficult to feed everyone and find time to work with a big family. This general perspective is likely to influence decisions to use contraception, including accessing voucher services, particularly as women discuss such issues with each other and strongly influence each other's behaviour.

"*I don't want to have any more children because I am poor. It is difficult if I have another baby as I have a 'shortage of hands and feet'*[7]*. Without another baby I have time to tend cattle.*" (Peri-urban Woman_RU)

When distributing vouchers, voucher promoters explain the benefits of using maternal health and family planning services and increase women's awareness of their availability at local health centres. This is a potentially important contribution to the existing milieu of knowledge held by women in Kampong Thom regarding reproductive and maternal health, which is likely to influence their decision to use services, including with a voucher.

Supply side health policy changes

[7] Khmer phrase meaning there is no one to help with the children.

Until relatively recently, within approximately the last five years, it was not typically possible to give birth at village health centres. Rather midwives predominantly assisted home deliveries. One service provider recalled that 30 years ago no midwives were stationed in villages. Capacity and quality of maternal health services at health centres has since improved, for example through more and better training. Villagers acknowledged this development, and now mostly prefer health centre deliveries over home births with TBAs (see above). Four women participants (peri-urban, rural, poor and non poor) and two programme implementers (peri-urban and rural) commented on improvements in the quality and availability of maternal health services at health centres.

"*It's different now, it's more modern than before, things became modern and very fast, unlike for my generation, then it was very difficult*." (Peri-urban Woman_NP)

"I have only been allowed to help women deliver babies in the health centre for the last five years." (Service Provider)

Additionally, the government has now banned the use of TBAs at home deliveries, and women *must* deliver at health centres. This, along with the Maternity Incentive Scheme, a government initiative to provide cash payments to staff for each facility-based delivery they attend, helps encourage the use of maternal health services at health centres.

"I didn't dare to deliver both babies at home, for fear of being blamed. The bpairt *told us when we go for ANC that we have to deliver at the health centre. I followed what they said."* (Peri-urban Woman_RN)

Discussion

Indications of an increasing preference for bio-medical over indigenous practices in pregnancy and childbirth are supported by Ovesen and Trankell's (2010) anthropological study of Cambodian healthcare. They discuss the medicalisation of motherhood and maternal health in Cambodia as an on-going process since the French colonial era (1863-1953) to the modern day. *Chhmob* (Khmer spiritual, social and physical birth attendants) remained the predominant support for Khmer women in pregnancy and labour until after independence, into the 1960s. During the dark years of the Khmer Rouge (1975-1979) and subsequent wars (1979-1989) Cambodia's medical system chronically deteriorated and the *chhmob* were co-opted to serve the regime rather than the general population. Through the UNTAC peace-keeping mission (1991-1993) the value of the indigenous knowledge and skills of the *chhmob* were recognised by NGOs and aid organisations in Cambodia. With this came a movement to 'skill up' the *chhmob* into TBAs with basic bio-medical midwifery training. A cadre of TBAs subsequently emerged with a greater focus on the physiology, rather than the spirituality, of childbirth, in the place of the traditional *chhmob*. However TBAs maintained certain traditional rituals surrounding childbirth, which continued to have significance for Khmer women, such as postnatal *ang pleurng*. At the start of the 21st century, Ovesen and Trankell state that the traditional *chhmob* and TBAs remained the dominant choice for Khmer mothers-to-be, compared to trained bio-medical practitioners (doctors, nurses and midwives), with the majority of births still taking place at home. At this time Ovesen and Trankell also observed a shift towards the use of "*strengthening injections*" to restore new mothers' energy, in place of *ang pleurng,* as found in qualitative data here. Ovesen and Trankell's documentation of this journey finishes in the early 2000s. Data collected for this thesis pick up from there, with evidence of a further move away from TBAs towards the use of fully trained midwives and nurses (at the village level) and doctors (at the provincial level). The history of the

medicalisation of maternal health and midwifery as described by Ovesen and Trankell provides important context for the current trends we observed whereby young Khmer women having their first children today predominantly seek care within the bio-medical system. Whilst this reflects seminal developments in terms of reducing maternal and neonatal mortality, Ovesen and Trankell reflect with some sadness on the final decline of a tradition dating back to the 12th century (Ovesen et al., 2010).

Liljestrand and Sambath (2012) outline the wider context of developments in Cambodia that have set the stage for the changing trends in use of reproductive and maternal health services observed in this study, including improvements in infrastructure, roads, communications; improved education, particularly of women; decreasing fertility rate and subsequent dependency ratio for the working population. Cambodia is now benefitting from a national policy focus on reaching the MDG targets, which has encouraged investment in the health system, particularly in maternal health, since 2007; midwifery training and the related cadre of professionals have been strengthened, for example through the new safe motherhood protocols (2010) and prioritising life-saving skills training; a strong focus is being placed on upgrading and improving emergency obstetric and newborn care (EmONC) centres and ambulance services for referral of complicated deliveries (Liljestrand et al., 2012). Liljestrand and Sambath (2012) suggest that compared to improvements in maternal health, progress in family planning is lagging behind national targets, and with national commitments to family planning weaker than those for maternal health, it is unlikely Cambodia will meet its MDG target for 2015 of 60% of married couples using a modern method of contraception (Liljestrand et al., 2012). This background of developments in policy and practice in Cambodia sheds additional light on the observed shifts in perspectives and behaviour relating to maternal health and family planning service use found in this study.

It is not possible to determine to what extent vouchers have contributed to the development of these trends, or whether, inversely, these trends have aided the uptake of vouchers observed to date. It is possible that the vouchers are merely 'pushing on an open door', and that these developments would have taken place, even in the absence of the vouchers. However, for those women who have used them, vouchers have genuinely removed the risk of indebtedness in accessing maternal health services.

RESEARCH PAPER 3

UNDERSTANDING ROADBLOCKS TO UPTAKE OF REPRODUCTIVE AND MATERNAL HEALTH VOUCHERS – A QUALITATIVE STUDY IN KAMPONG THOM PROVINCE, CAMBODIA

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RESEARCH PAPER COVER SHEET

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SECTION A – Student Details

Student	Antonia Dingle
Principal Supervisor	Timothy Powell-Jackson
Thesis Title	Equity of access to reproductive and maternal health services – equity trends, poverty targeting and demand side financing

If the Research Paper has previously been published please complete Section B, if not please move to Section C

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Where is the work intended to be published?	Health Services Research
Please list the paper's authors in the intended authorship order:	Antonia Dingle, Timothy Powell-Jackson, Ben Bellows, Catherine Goodman
Stage of publication	Not yet submitted

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary).	AD collected the data, conducted the analysis, and wrote the draft manuscript. BB, TPJ and CG provided input into the design of the study as well as the analysis, and reviewed all drafts of the paper. All authors approved the final manuscript.

Student Signature: _____ Date: _____

Supervisor Signature: _____Date: _____

7.2 Abstract

Introduction

Demand side financing (DSF) is thought to offer potential in the move towards universal health coverage, although there is currently limited evidence regarding DSF mechanisms in low- and middle-income countries (LMICs). This paper explores people's experiences with one such DSF, a voucher programme in Cambodia, known as Vouchers for Reproductive Health Services (VRHS).

Methods

Data for this study were collected from peri-urban and rural study sites randomly selected within Kampong Thom province. Study participants were purposively sampled across sub-groups comprising voucher users and non-users, service providers, and staff implementing the VRHS project. Semi-structured interviews were conducted with participants, and data were analysed using framework analysis.

Results

Quantitative data suggest that the majority of safe motherhood and family planning vouchers in Kampong Thom distributed between January 2011 and September 2012 were not used. Evidence of multiple roadblocks to voucher implementation were found, which help to explain poor voucher uptake. These included women forgetting the details of voucher services, a preference for non-voucher services and their affordability, prevalence of negative rumours about voucher services, seasonal migration of voucher beneficiaries away from voucher facilities, the opportunity cost of using voucher facilities, distance and transport to facilities, and the possibility of service costs being claimed through government schemes other than VRHS.

Conclusion

This study depicts the complex challenges relating to uptake of maternal health and reproductive health vouchers in Cambodia. Low uptake of vouchers is explained by the

presence of multiple roadblocks to voucher implementation, which can be understood as relating to other price, individual, household and community factors influencing demand for services.

7.3 Introduction

As the era of the Millennium Development Goals (MDGs) draws to a close, the focus of the international health community increasingly concerns universal health coverage, equity, and improving access for and the health outcomes of poor and marginalised groups (Tangcharoensathien et al., 2011; "The Bangkok Statement on universal health coverage," 2012; United Nations, 2012; World Health Organisation, 2010). Concomitantly, there is renewed attention to the demand side of health systems. Demand side determinants can manifest as multiple barriers to service utilisation including education and information barriers; consumer cost barriers; household and community barriers (Ensor, T et al., 2004; O'Donnell, Owen, 2007). These barriers disproportionately affect the poor, resulting in under-utilisation of services amongst those arguably most in need (Ensor, T et al., 2004; O'Donnell, Owen, 2007; Prata et al., 2009). Furthermore, such barriers are acknowledged as a key reason for slow progress in reducing maternal deaths worldwide (Prata et al., 2009). Therefore, interventions aiming to overcome demand side barriers are considered to be a promising tool, of the many required, to move countries towards universal health coverage. Demand side financing (DSF) mechanisms typically include vouchers, cash incentives of various forms, in-kind transfers, and various other types of consumer subsidies among disadvantaged populations (Murray et al., 2014; Witter et al., 2012).

This paper focuses on targeted vouchers for reproductive and maternal health services in Cambodia. The hypothesised benefits of vouchers are that they can target services to explicit groups, they encourage use of under-consumed services, and increase competition between providers, in doing so improving service quality (World Bank, 2005). In the health sectors of Africa, Asia and Latin America, vouchers have been used to remove or reduce user fees for a range of services including contraception, antenatal care (ANC), delivery services, postnatal care (PNC), abortion services, treatment for

sexually transmitted infections, insecticide treated bed nets, cervical cancer screening and gender based violence recovery services (Ahmed et al., 2011; Bellows, Nicole M et al., 2010; Borghi et al., 2005; Ekirapa-Kiracho et al., 2011; Ir et al., 2010a; Meuwissen et al., 2006; Poel et al., 2014; Schmidt et al., 2010). Meyer et al (2011), synthesising findings from 24 health voucher studies, suggest that there is robust evidence of the impact of vouchers on service utilisation, modest evidence of their impact of effectively targeting beneficiaries, modest evidence of their impact on the quality of contracted services, and insufficient evidence of their impact on efficiency of services (Meyer et al., 2011).

There is a growing literature on voucher interventions in reproductive and maternal health, with systematic reviews finding mixed evidence of their impact on a range of outcomes (Bellows, Nicole M et al., 2010; Meyer et al., 2011). For example, maternal health vouchers in Bangladesh were found to significantly reduce out of pocket expenditure for beneficiaries and to significantly increase use of maternal health services. However, whilst increased use of maternal health services was found amongst voucher beneficiaries in Cambodia, no test of statistical significance was performed; although use of reproductive health services was significantly higher amongst voucher beneficiaries in Nicaragua, increased use of modern contraceptive methods was not significant; and use of STI services was not found to be significantly higher in Uganda (Bellows, Nicole M et al., 2010).

Reproductive and maternal health vouchers have a relatively short history in Cambodia, and are now available in approximately one third of the country, provided by a range of organisations, some targeting the poor while others cover all pregnant women (Ir et al., 2010a, 2011; Poel et al., 2014). The Vouchers for Reproductive Health Services project (VRHS), funded by the German Development Bank, KfW, has been

operating in three provinces in Cambodia since 2011, covering a total population of approximately 2.4 million, providing reproductive and maternal health vouchers for poor and vulnerable women (EPOS Health Management, 2010). Ir et al (2010) provide descriptive analysis suggesting that the BTC vouchers increased use of facility deliveries amongst beneficiaries (Ir et al., 2010a). Van de Poel et al (2014) report that between 2007 and 2010 maternal health vouchers in Cambodia significantly increased the likelihood of delivering in a public health facility, by 10.1 percentage points (pp) for all women ($p<0.05$) and by 15.3pp for poor women ($p<0.05$), with the impact greater for both poor and non-poor in districts with universal voucher schemes compared to targeted. Targeted vouchers had no impact on use of antenatal care (ANC), whilst universal vouchers increased the likelihood of using at least three ANC visits by 5.4pp for all women ($p<0.05$) and by 10.1pp for poor women ($p<0.05$). Targeted and universal vouchers had a significant impact on use of postnatal care amongst the non-poor (5.6pp and 6.0pp respectively, $p<0.01$) but no effect on use of postnatal care PNC for the poor (Poel et al., 2014).

Qualitative studies play a potentially important role in aiding our understanding of, for example, beneficiaries' and implementers' perceptions and experiences of vouchers, their acceptance of the intervention, and whether it has the potential to reduce demand side barriers, reasons behind the use or non-use of vouchers, and insights into how voucher interventions could be better designed. Very limited qualitative evidence exists regarding implementation of health vouchers in Cambodia. Brody et al (2013) investigated women's experiences at the start of VRHS implementation in Cambodia. They found a combination of factors contributed to use and non-use of vouchers, relating to women's pre-existing knowledge and experience of health services, factors relating to the distribution of the vouchers, and factors relating to how vouchers can be redeemed, such as transport costs and availability of services. However, the study was

conducted early during project implementation, when only a few participants had actually utilised services with vouchers (Brody et al., 2013).

This study aims to address some of these research gaps by qualitatively exploring uptake of vouchers in Cambodia's VRHS project, specifically in Kampong Thom province. The study includes development of a logic model to ascertain the key steps in the implementation chain of the project, to help understand the factors influencing voucher redemption. Data generated through semi-structured interviews are then used to explore the reasons for variation in uptake of vouchers. Finally the logic model is used to interpret the findings and suggest improvements to the implementation of the programme. In doing so the study contributes to the wider knowledge base on demand side financing for health in developing countries, the implementation of such interventions, and their role in improving health equity and moving towards universal health coverage.

7.4 Methods

7.4.1 Study setting

Cambodia is one of the poorest countries in South-East Asia (World Bank, 2013b). 20.5% of the population is estimated to be poor, based on estimates of household consumption, a reduction in poverty from 53.2% in 2004 (World Bank, 2013a). 80% of Cambodia's 14.8 million population is rural (National Institute of Statistics, 2008). Maternal health has improved substantially over the last 15 years, with a dramatic reduction in maternal mortality and increases in use of services (Table 7.1). Gains in maternal health have benefitted the poor as well as the non-poor, with improvements in maternal health equity between 2000 and 2010 (Dingle et al., 2013). However, contraceptive prevalence remains low (Table 5.3.1).

Health service user fees were formalised in Cambodia in 1996 under the National Charter on Health Financing (Bitran et al., 2003). As a result costs only minimally increased for users compared to previous informal charges for services (James et al., 2006). A fee waiver system was also introduced, although this was largely unsuccessful and did not always benefit the poor (Bitran et al., 2003). To combat shortcomings of the fee waiver policy, Health Equity Funds (HEFs) were introduced in 2000 to provide subsidised tertiary healthcare for the poor, with health providers reimbursed by a third party purchaser. Poor households eligible for HEF membership are identified through Cambodia's poverty identification system, the ID Poor programme. The ID Poor Programme is a national mechanism identifying the poor that has been operating since 2007. The Ministry of Planning (MOP) implements the programme with technical support from the German Development Agency, GIZ. The ID Poor aims to identify poor households in a way that achieves a good match with villagers' perceptions of who is poor (World Bank, 2012a), such that social programmes can target activities and resources to those most in need.

Table 7.1: Reproductive and maternal health statistics, Cambodia, 2000 and 2010

Indicator	2000	2010
Maternal mortality ratio	437 per 100,000 live births	206 per 100,000 live births
Women with one ANC visit with skilled provider during last pregnancy	12.70%	89.0%
Women with at least four ANC visits with skilled provider during last pregnancy	8.90%	59.4%
Births occurring in health facilities	9.9%	53.8%
Home births	89.0%	45.4%
Births assisted by skilled birth attendant	31.80%	71.0%
Births followed by PNC visit	54.10%	73.6%
Use of modern contraceptive method amongst currently married women	32.40%	34.9%

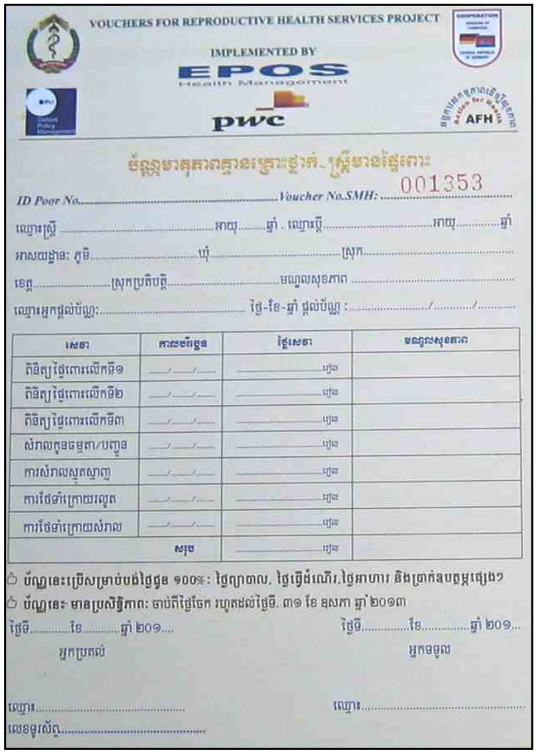
Use of contraceptive pill amongst currently married women	16.40%	15.4%
Use of contraceptive injection amongst currently married women	15.40%	10.4%
Source: Cambodia Demographic and Health Surveys, 2010 and 2000		

7.4.2 The Vouchers for Reproductive Health Services (VRHS) Project

VRHS is a three-year programme which began in January 2011 and is being implemented in three districts in Kampot, Kampong Thom and Prey Veng provinces respectively, a total of 9 districts. Three types of voucher are provided to poor women, for family planning, safe motherhood and safe abortion, all of which are distributed free of charge to poor households that qualify on the ID Poor poverty identification tool. Transport costs and a food allowance for users are also included. Safe abortion vouchers are not distributed directly to beneficiaries, rather they are made available only at facilities, making the dynamics regarding their uptake different to that of the family planning and safe motherhood vouchers. This study investigated the family planning and safe motherhood vouchers only, which were distributed to poor beneficiaries in their homes. The family planning voucher comprises seven coupons for individual services – two consultation visits to discuss contraceptive needs, IUD insertion and removal, contraceptive implant and removal, and sterilisation. The safe motherhood voucher comprises nine coupons for individual services – four ANC visits, normal delivery, complicated delivery, caesarean section, and two PNC visits. Vouchers entitle beneficiaries to free care for all services with contracted public and private facilities. Vouchers are distributed for free via voucher promoters (VPs) who each cover several villages. Family planning vouchers are distributed to all married women of reproductive age, whilst safe motherhood vouchers are distributed only to pregnant women. The voucher management agency (VMA) manages a disposition fund to reimburse providers for services provided to voucher users. Providers are reimbursed

on a fixed fee basis for each service provided. Figures 7.1 and 7.2 shows pictures of the safe motherhood and family planning vouchers.

Figure 7.1: Safe motherhood voucher



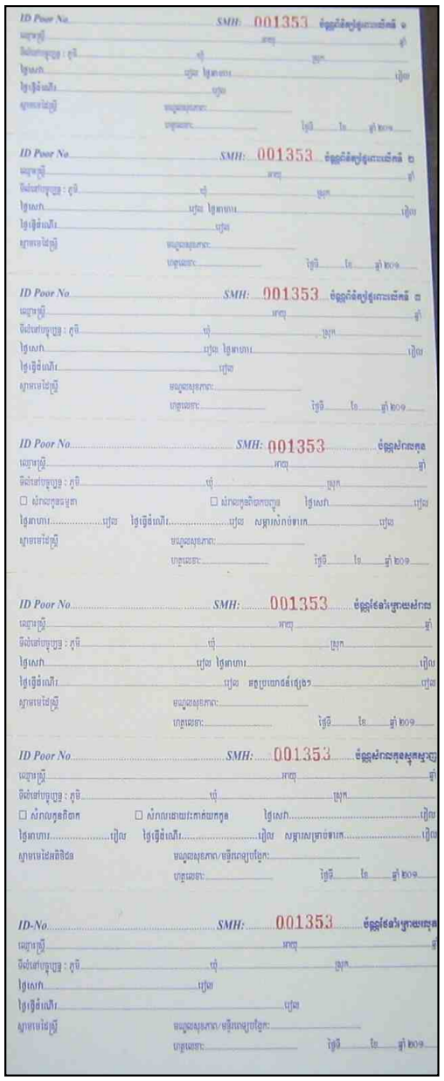
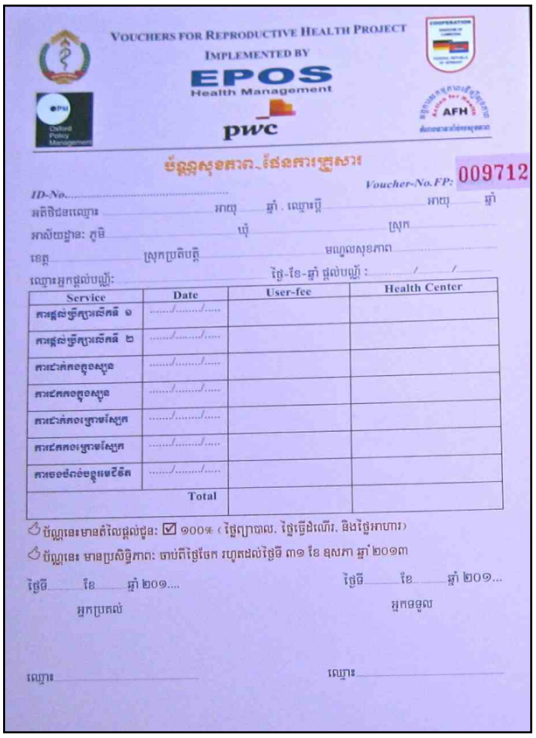
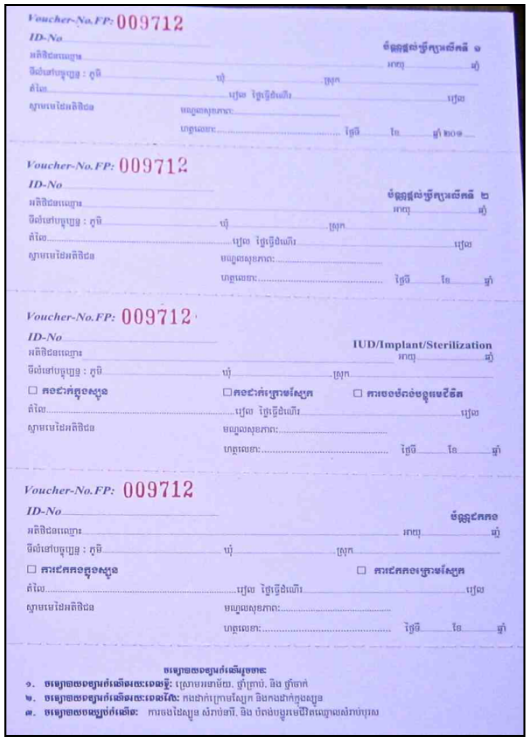
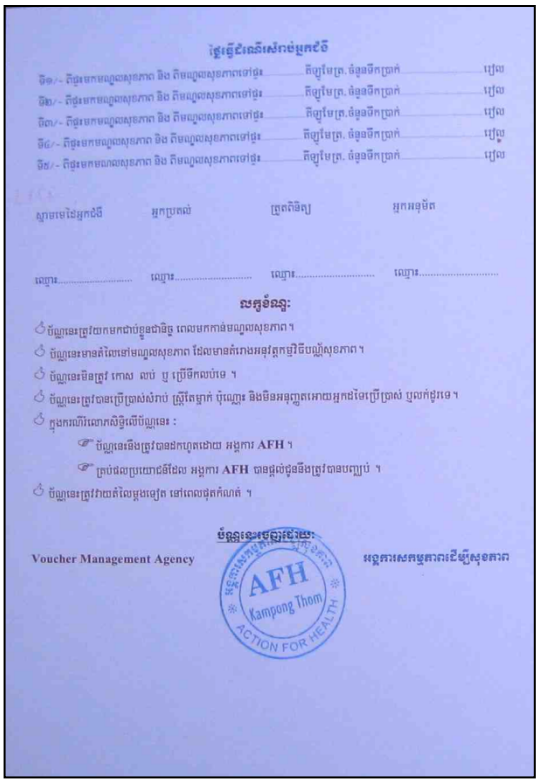
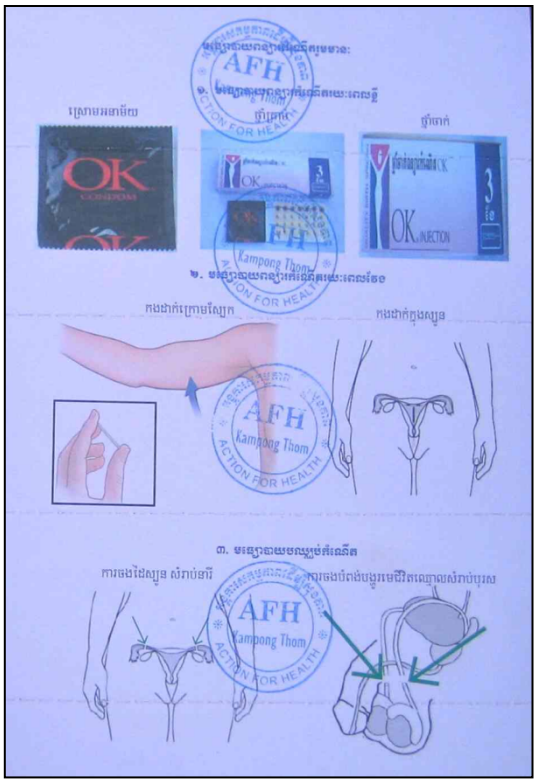


Figure 7.2: Family planning voucher









Like the HEFs, VRHS uses the ID Poor programme to identify households eligible to receive vouchers. In the event that a VP meets a family without an ID Poor card who they think could be poor, the VP is authorised to conduct their own poverty assessment, using the same ID Poor tool, and distribute vouchers if the family is found to be poor.

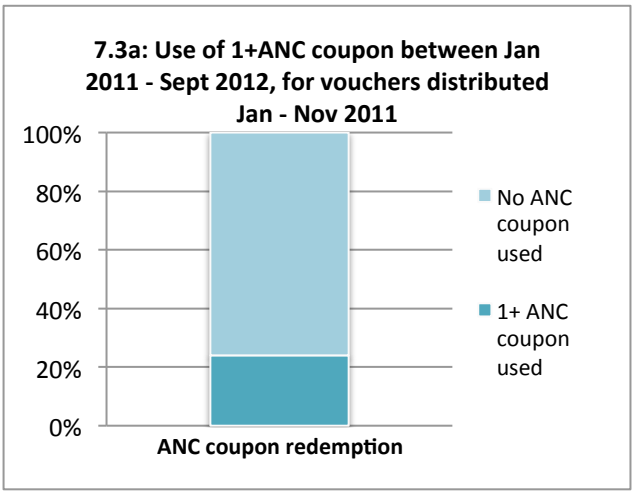
The VRHS project was intended to dovetail with HEFs, providing free access to primary level reproductive and maternal healthcare, not covered by HEFs. However, expansion of HEFs to primary level facilities from 2011, meant that in practice there was some overlap between HEF and VRHS in facilities covered.

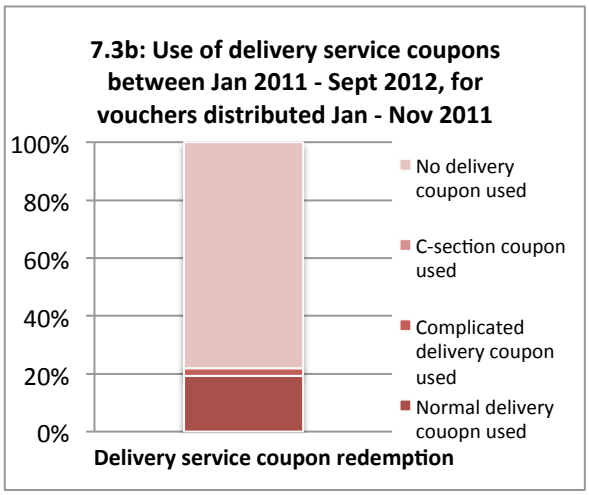
Figure 7.3a-d present voucher coupons used by type of service, across all three VRHS provinces, for the period January 2011 (start of the project) to September 2012 (when the database was accessed by the researchers). The denominator in Figure 7.3a-c is all pregnant women who received a safe motherhood voucher between January 2011 and November 2011 (which excludes women who had received a voucher but for whom insufficient time had elapsed for it to be used), and the numerator is women who received and used the safe motherhood voucher. For Figure 7.3d the denominator is all married women who received a family planning voucher between January 2011 and June 2012 (which excludes women who had received a voucher but for whom insufficient time had elapsed for it to be used), and the numerator is women who received and used the family planning voucher.

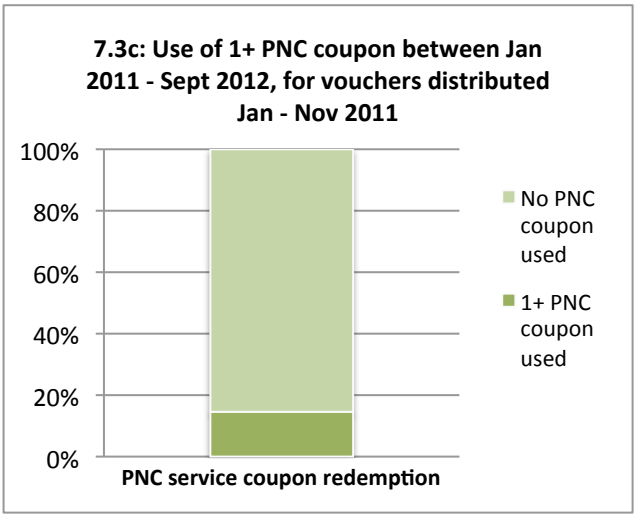
Figure 7.3 shows that the majority of distributed vouchers had not been used during this period. 24% of women had used at least one ANC coupon. This dropped to 19% of women who had used at least two, 14% at least three and 0.1% four coupons. 22% of delivery coupons had been used, the majority for normal deliveries, and 15% had used

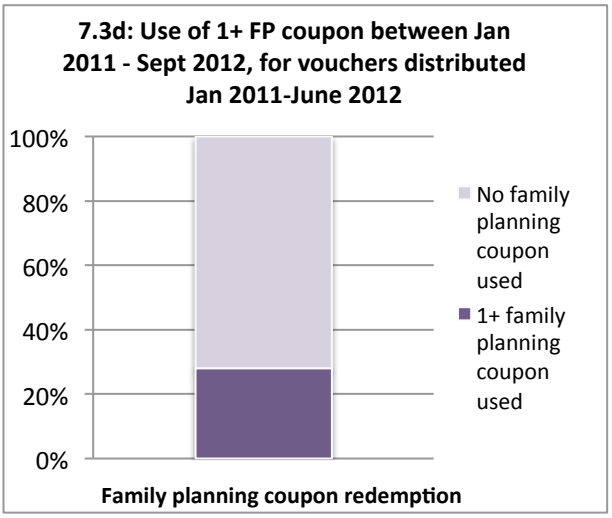
at least one PNC coupon. 28% of women with family planning vouchers had used at least one consultation visit, 2% used the second consultation, 1% used the IUD coupon and 5% used the contraceptive implant coupon. These data suggest that voucher uptake between January 2011 and September 2012 was low. Whether the low uptake matters, and what could be done about it will depend on an understanding of why uptake is low. This provides the rationale for this qualitative study.

Figure 7.3a-d: Use of vouchers by service, Jan 2011 – Sept 2012, for vouchers distributed Jan – Nov 2011 (safe motherhood) and Jan 2011 – June 2012 (family planning)









7.4.4 Sample selection

Data for this paper were collected as part of a larger study evaluating the VRHS project (Bellows, Benjamin et al., 2011). Kampong Thom was systematically selected as the study province from the three provinces in which VRHS was operating. Kampong Thom has a total population of 672,000 (National Committee for Sub-National Democratic Development (NCDD), 2009), 33% of which is poor, a reduction from 42% in 2004 (Eng et al., 2010). Serving this population from the public sector are two referral hospitals, 51 health clinics, six doctors and 26 secondary midwives (National Committee for Sub-National Democratic Development (NCDD), 2009). In addition to public services, many private clinics and drug vendors also operate in Kampong Thom, some run by staff from public facilities outside of operating hours. The training and expertise of individuals working as private practitioners is extremely variable. An extensive network of traditional birth attendants (TBAs) also operate throughout Kampong Thom, as in other provinces across Cambodia, who were for many decades the primary source of support and advice during pregnancy and labour (Ovesen et al., 2010). VRHS contracted village level public health centres and also one private provider in Kampong Thom town, run by a reputable international NGO (INGO), specifically to provide FP voucher services to beneficiaries. The INGO was contracted by VRHS as most health centres did not have the training and/or equipment to provide the implants and IUDs available with the FP vouchers.

By the start of VRHS, roll-out of the HEFs had been expanded to cover approximately 40% of primary level facilities, including the health centres in both study sites. This was representative of the wider situation in other districts in the province, and other provinces in Cambodia, where roll-out of HEFs is resulting in an overlap with VRHS vouchers.

One peri-urban (on the fringes of the urban provincial capital) and one rural commune within the province were selected, and two villages from these communes were then selected as the study sites. Distinctions between rural and peri-urban areas were based on classifications used by VRHS. Two different types of research site were use in the study to allow for exploration of differences in experiences of the programmes under study within rural and peri-urban areas respectively. Literature reviews conducted for the PhD and the theoretical frameworks on which the thesis draws identify rural/urban location as an important factor in determining use of reproductive and maternal health services. Therefore it was perceived to be a worthy dimension to capture within the study design.

Study participants were purposively sampled across six sub-groups, chosen to provide a breadth of perspectives on the VRHS programme (Figure 7.4). A sampling frame was constructed using the latest round of the ID Poor poverty identification data (2009), and details of women who had received and/or used safe motherhood and family planning vouchers from VRHS. The sampling frame was used to randomly select participants within three sub-groups in each site – poor women who did not have a voucher (NN); poor women who received a voucher but had not used it (RN); and poor women who received a voucher and had used it (RU). Approximately three women per sub-group per site were recruited. A fourth sub-group was also created, non-poor women (NP), of whom approximately three were sampled per research site.

The women sampled for the study had some similarities; they were between their early twenties and late thirties in age, most had between one and four children, with older women having more children, one older very poor woman had 7 children. Many of the women (poor and non-poor) worked in farming, either farming other people's land or their own if they had it, or looking after cattle. Non-poor women were engaged in

employment providing higher income than poorer women, such as running their own shop in the market, making and selling palm oil and palm sugar, making and selling food and drinks in their villages. Proximity to the highway in the peri-urban site provided more opportunities for daily labouring – many of the women had husbands who worked as masons, carving stone statues at the workshops along the highway. There seemed to be more and varied opportunities for unskilled labour in the peri-urban compared to rural study sites. Poorer households in the peri-urban site also seemed to be slightly better off than poor households in the rural site – slightly more possessions within the house, for example, and fewer houses made of only very basic bamboo. Most women had some years of education although most had not completed primary education and very few had completed secondary education.

Programme implementers comprised the fifth sub-group, including staff from the VRHS project, the ID Poor programme, and the HEF programme. Health service providers in rural and peri-urban sites were purposively sampled as a sixth sub-group of participants.

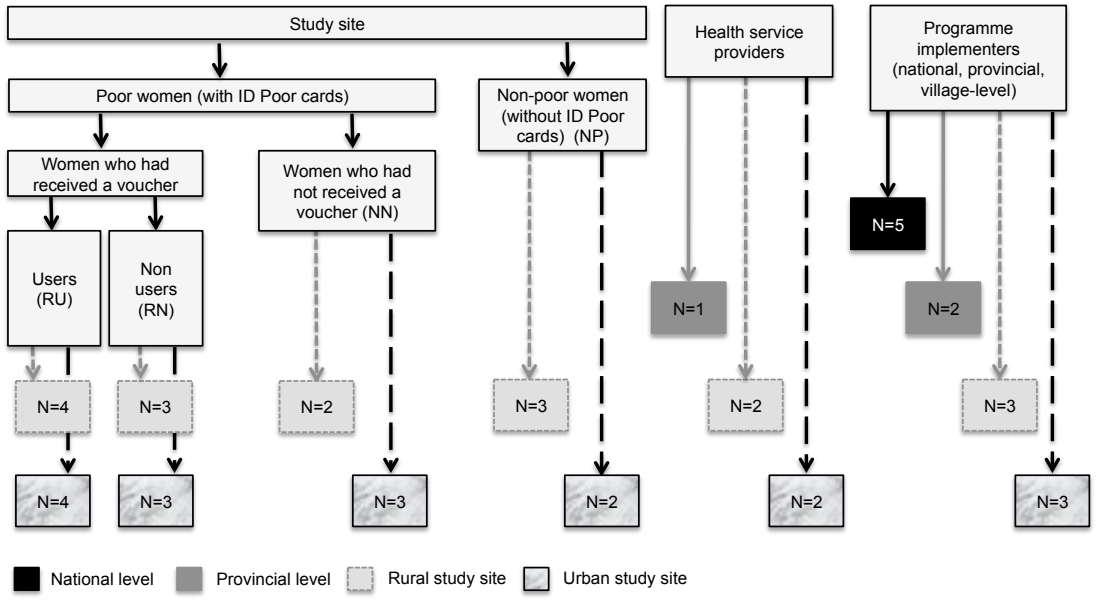


Figure 7.4: Data collection sampling frame

7.4.5 Data collection and management

42 participants were included in the study, with data gathered through individual semi-structured interviews between June and October 2012. Seven interviews were conducted in English, 35 in Khmer. Khmer-language interviews were conducted with an experienced female Khmer interpreter who consecutively translated the discussion from Khmer to English.

Ethical approval for the study was granted by the Cambodian National Ethics Committee for Health Research, and the Observational and Interventions Research Ethics Committee of the London School of Hygiene and Tropical Medicine. Informed consent was gained from all participants prior to data gathering. Interviews were conducted in a private space wherever possible, usually in participants' homes or offices. Written informed consent was gained from all participants to digitally record interviews. Hand written notes were also made during the interviews. Audio recordings of interviews were transcribed, and Khmer transcriptions then translated into English.

7.4.6 Analysis

Interview data were coded in QSR International NVivo 10. A coding scheme was developed using a hybrid inductive-deductive approach, with themes and codes developed partly through reading and re-reading the data, and partly based on a pre-existing conceptual framework (Bradley et al., 2007; Fereday et al., 2006). The initial coding scheme was piloted in a sample of transcripts from across participant sub-groups, reviewed and refined until no new codes emerged from the data, before being applied to all data. In developing the coding scheme, one transcript was co-coded by a

colleague outside the research team to enable discussion about coding, provide additional insight and refinement to the process, and improve reliability of the analysis.

A framework analysis approach was used whereby data were extracted from coded transcripts to populate thematic charts based on each central theme within the data (Ritchie et al., 2003). Key dimensions within sub-themes were identified, summarised and interpreted into categories. Categories were then grouped where relevant to produce an overview of the data within each sub-theme. As themes developed, data were crosschecked across sub-groups of participants to look for consistency and/or differences of opinion on issues. Categories within sub-themes were considered and re-organised to tell the main stories emerging from the data. Once established, the themes and findings were discussed with the Khmer interpreter present throughout the data gathering, to triangulate the interpretation of the data and to ensure it was true to the discussions undertaken during data gathering.

Validation of preliminary findings from the data by respondents was sought (Green et al., 2005; Pope et al., 2006; Reynolds et al., 2011). The research team returned to all participants and discussed preliminary findings, either individually, or in a group setting for villagers, and provided an opportunity for participants to comment on whether our interpretation of the data was accurate, and reflected their experiences of the issues under study.

7.5 Results

There was agreement and appreciation amongst participants who had received vouchers (poor women) that the vouchers reduced formal service costs, and were influential in their decision of where to seek care. This is potentially important, as

around half of peri-urban and rural households reported previously borrowing substantial amounts of money to pay for maternal health services, usually from other family members, or selling assets.

"*For my first two pregnancies I had no ANC and gave birth at home… At that time I was afraid to spend money at a health facility… For my later pregnancies I [*had ANC*] because the NGO came to interview me and called me to a meeting. They told me to go for ANC and to deliver the baby at the health centre. They gave me the voucher and I discussed it with neighbours, family and my husband. We decided together*." (Peri-urban Woman_RU).

"Without the voucher I would have to pay the service fees. If I can't afford it I would have to borrow money from someone. If we can't pay for the services the bpairt *[health practitioner] won't help us deliver our baby."* (Rural Woman_RU).

Service providers suggested that the vouchers were influential in women's decision of whether and where to seek care.

"Before the vouchers some women would pay for one or two ANC visits, with the voucher they use ANC more and more." (Service provider).

Despite this, it was clear that there was relatively low uptake of vouchers amongst participants with vouchers in rural and peri-urban settings, reflecting the fact that demand for these services is influenced by many factors other than formal prices. These additional factors are discussed below.

A logic model was developed during the analysis process, to show the intended implementation process of VRHS, and help organise and interpret the findings, see

Figure 7.5. The model depicts several implementation stages. This paper is concerned with the six stages directly related with beneficiaries' decision-making and care-seeking regarding uptake of the vouchers, in order to understand the trends in use outlined in Figure 7.3. The paper does not consider the other stages of the project, which are important for overall implementation of the project, but less central to the issue of voucher uptake by beneficiaries. Figure 7.5 illustrates the steps taken by project implementers, women and facility staff to ensure voucher use, and the 'roadblocks' or barriers to implementation that became apparent during data analysis.

7.5.1 Roadblocks to deciding to use vouchers

For eligible voucher holders, six prohibitive factors were relevant here – women forgetting the details about the vouchers after they received them, a preference for non-voucher services, the affordability of alternative services, negative rumours about voucher services, seasonal migration, and the opportunity cost of using vouchers.

Forgetting voucher details

More than a third of women who received a voucher, rural and peri-urban, stated they had since forgotten the details about the family planning methods they could receive with it. This is likely to impede women's decisions to use their vouchers.

"*When they gave me the voucher they told us everything, but I forgot*." (Rural Woman RU)

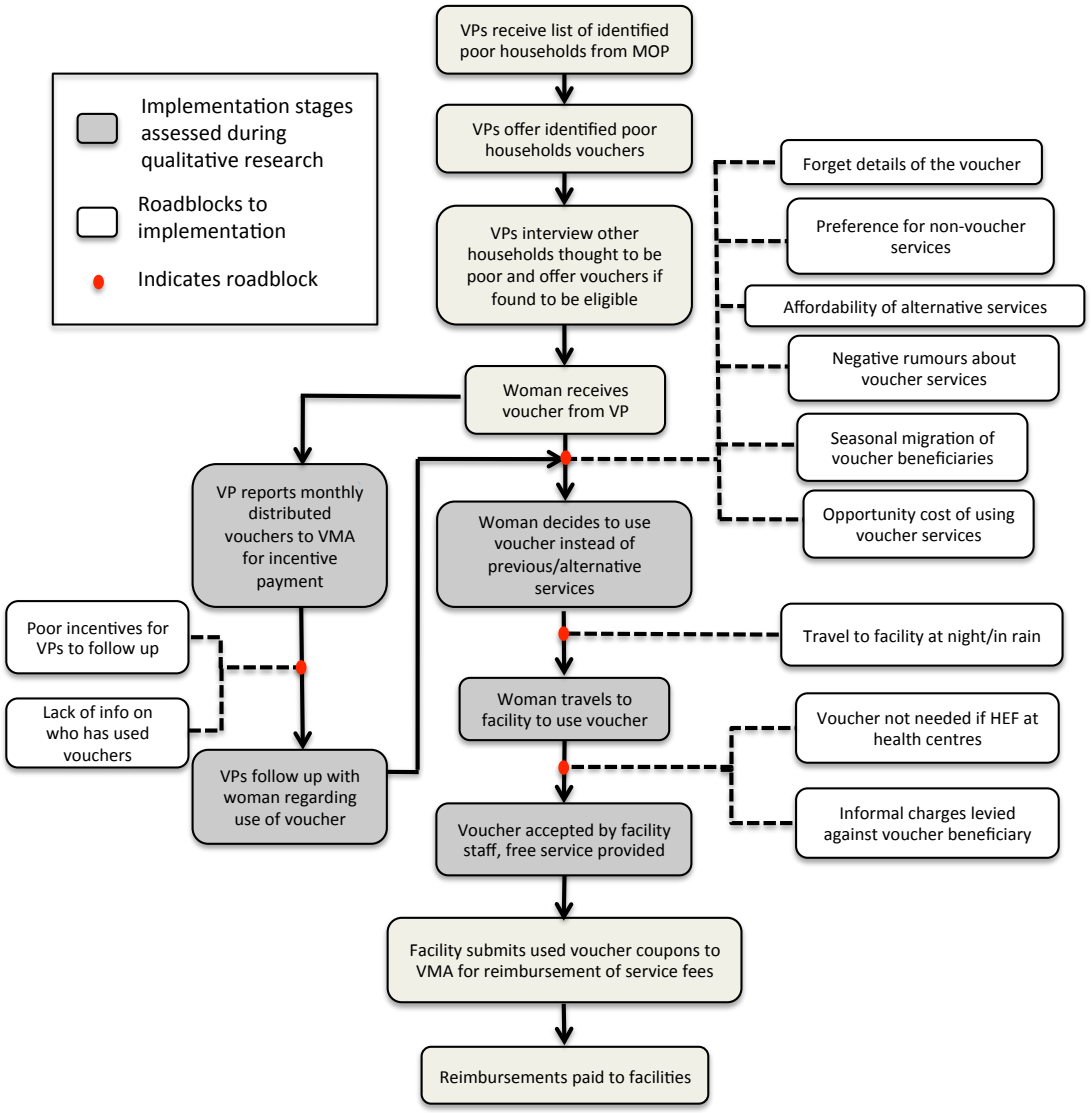


Figure 7.5: Implementation diagram of VRHS with roadblocks to implementation

Preference for non-voucher services

A preference for non-voucher over voucher services was particularly striking regarding family planning services. 17 out of 24 women, peri-urban and rural, poor and non-poor, were using a short-term method of contraception, either pills or injection. Most used the injection. Voucher recipients were able to access short-term methods with the vouchers, when using their consultation coupons, however as only two consultation

coupons were included with each voucher they could only access such methods twice. The other coupons available with the voucher are for long-term contraceptives (IUDs, implants, and sterilisation). The premise behind this was that consultations would be used to provide eligible women with adequate information on a comprehensive set of FP methods, in order to choose their preferred method. Short-term methods would be made available at these consultations, in order for women to have access to contraception whilst they made a decision with regards to the use of a long-term method. Women overwhelmingly preferred short-term methods because they were convenient, they knew other women who were using them, and it was easy to stop using them if they wanted more children, and therefore tended to seek them from private providers.

"Taking pills is easy. I don't want to use any other method." (Rural Woman_NP)

"With injection if we want to stop immediately we can. With the IUD or implant we have to go to the NGO to have it removed. I don't want to waste their time with this. I am satisfied with the injection. If I want to stop I can today or tomorrow." (Peri-urban Woman_RN)

Rural and peri-urban service providers and programme implementers concurred that women preferred short-term contraception, particularly the injection.

"Some women want me to help pay for more short-term family planning for them. They don't like implants or IUDs and want injections and pills instead… they are afraid long term methods will badly affect their health." (Rural prog implementer)

Regarding safe motherhood vouchers, some women preferred to continue to use TBAs for ANC and home delivery. Reasons for this included because they experienced a quick, uncomplicated labour, because women chose to follow the advice of their elders and relatives who favoured TBAs over modern health providers, and in some cases because they were already in the habit of using TBAs with previous births.

"*Some women still deliver at home, e.g. if their delivery is not difficult... If the delivery is difficult they come to the health centre*." (Service Provider)

"*I decided myself to have the babies at home, I was in the habit of it, I didn't discuss it with my husband*." (Peri-urban Woman_RN)

Affordability of alternatives services

Contraceptive pills and injections were relatively inexpensive in Kampong Thom, costing on average 3000 Riel (USD 0.75) for the injection (every three months), and 2000 Riel (USD 0.50) for the pill (every month). These products cost the same at private providers as at health centres, although additional transport costs may be incurred in accessing the health centre, which was not always within walking distance for residents, whereas informal/private providers were closer to many voucher recipients. In the absence of available cash to pay for such services, private providers may also allow services to be purchased on credit. Furthermore, private providers are accessible in local markets, in their own houses, or will come to client's houses, and services are made available at convenient times, outside of women's working hours, unlike health centres which open Monday to Friday, 8-11am. In short, cost of the product is not a prohibitive barrier for accessing short-term methods for most poor women, and this is likely to negatively impact the uptake of family planning vouchers, the main purpose of which is to remove cost barriers.

"*2000 Riel [US$0.50] is not a lot of money. If we buy in the market, 1 strip [of contraceptive pills] is 2000 Riel*." (Rural Woman_RU)

"I go to the local bpairt *[private health provider]. If I go to the health centre I have to pay for a moto-taxi to get there, 3000 Riel. The private* bpairt *is nearer, we can just pop to there. The health centre is very far. Also if we don't have enough money, we can just owe the private* bpairt*."* (Peri-urban Woman_RN)

Negative rumours about voucher services

A recurring issue when discussing use of long-term contraception was the prevalence of negative rumours surrounding these methods. 10 out of 24 women participants (half rural, half peri-urban) had heard stories of negative side effects from implants and IUDs, dissuading them from using such methods. Rumoured side effects included heavy menstrual bleeding, discomfort, devices moving around the body, and inhibiting women's heavy work. Women in our sample were heavily influenced by the behaviour of their peers, and these rumours seemed powerful deterrents of long-term contraception.

"*If I use the implant or IUD I am afraid I won't be able to do hard work like chopping wood, pulling out rice seedlings or carrying water… I heard many negative stories about using the implant or IUD so they scared me a little bit. They didn't fit some women well, they had non-stop bleeding*." (Rural Woman_RU)

"*Some women use the implant or IUD. I've heard it hurts, so I just ignore it. Implants have left some women visually impaired, slothful and unwell. They are annoying; they make us unhealthy. Some women don't have any problems with them but around here most*

women do. One of my neighbours had problems and had to get it taken out." (Rural Woman_NP)

VRHS implementers acknowledged that women prefer short-term methods rather than implants, IUDs or sterilisations. The INGO contracted by VRHS to provide implants and IUDs to voucher holders had experienced some women's dissatisfaction with long-term methods and requests for removal, citing heavy or irregular periods, loss of appetite or weight loss as problematic symptoms. Furthermore they suggest that rumours and removal requests may persist, as clients are ill informed about expected temporary side effects.

"Voucher promoters can't explain well about all expected side effects [of implants and IUDs], they just say about free services and transport money…I have already suggested to VRHS a year ago that I do a half day training…to improve their explanations… so that when women have implant or IUD the symptoms they experience at first is not a surprise, this could help with rate of removals demanded. I offered to do training for free, but so far I have not been taken up on this." (Service provider)

Seasonal migration away from voucher facilities

Most poor households engage in seasonal work in Cambodia, as daily farming labourers during the rainy season, migrating to urban areas during the dry season. The vouchers can only be used in contracted facilities in the project provinces; they are not portable to other areas. (This constraint is also faced with HEF cards.) Therefore when women work away from home, they are unable to use their vouchers.

"We are distributing vouchers for free but some women still don't use them. For example in dry season many women go to Phnom Penh for work… So there are about four months

[a year] when they can't use the voucher. When the rainy season comes they will come back [to their village]." (National level programme implementer)

7.5.2 Roadblocks to travelling to voucher facilities

Three issues were prevalent regarding roadblocks to travelling to voucher facilities – finding the cash to pay for transport, the opportunity cost of the time required to visit facilities, and the additional challenges of accessing facilities at night and/or in heavy rain. These are discussed in turn below.

Cash to pay for transport

Whilst the vouchers include a reimbursement package for travelling to an accredited facility, this cost must be paid upfront by the beneficiary and claimed back once they have reached the facility. One third of rural women with vouchers stated an interest in getting an implant, but lacked the money for transportation to the INGO facility providing implants, 30kms away, despite the fact that they would be reimbursed this cost on arrival at the facility.

"*I want to have the implant, but I don't have the money for the transport to get there. If I had the money for transport I would go*." (Rural Woman_RU)

Several providers agreed that only a minority of family planning voucher users go to the provincial town to access long-term methods. One peri-urban voucher holder had not used their family planning voucher, but intended to go to the INGO, 19kms away. However as she had never been to the provincial town before, she was waiting for multiple reasons to warrant the journey. This illustrates the rarity of travelling to the provincial town for village women, and why a closer, local provider is a logical alternative for them.

A service provider at the INGO stated that on occasions when providing outreach voucher services in villages, uptake has been much greater.

"*The project wants me to provide services at village health centres so clients don't have to travel far, we want them to be comfortable, but I don't have enough time to do this. When I do go, we have a good response from women, many come for services.*" (Service Provider)

For some women even travelling to the village health centre to use family planning vouchers is inconvenient, compared to using local private clinics for the same cost, which are easily accessible on foot, incurring no additional transport costs.

"I use the injection. I use the [private] village bpairt*, not the health centre. I don't want to go to the health centre as I have no money for the moto-taxi and I am busy looking after goats and cows. The [private] village* bpairt *is easier and closer."* (Peri-urban Woman_RN)

Opportunity costs of accessing voucher services

Distance to the provincial town, and poor road conditions, particularly for rural participants, can require a full day to travel to the contracted INGO, receive treatment and return home. The decision to seek care at the INGO thus results in a day of lost income, and necessitates finding someone to look after women's children and cattle. In addition the usual chores such as cooking for the family cannot be undertaken. These amount to substantial opportunity costs for a voucher holder. Even using the village health centre as opposed to local private clinics is perceived as time-consuming for some women, deterring its use.

"When I go to the health centre I have to leave my children and house behind, we have to wait until everything is done. It isn't easy." (Peri-urban Woman_NN)

Accessing facilities at night and in heavy rain

Lack of access to health centres for delivery at night, during heavy rain, in the absence of personal means of transport, were cited by some peri-urban women as reasons for home births occurring in the last five years. If transport is needed at such times, there may be no means available to take women to facilities, even if they were able to pay for it up front and claim a reimbursement through the voucher.

"*I had both babies at home. Both times when I went into labour it was raining and difficult to get to the health centre. I had planned to go, but at the time I couldn't get there. I called the TBA instead. I planned to go to the health centre as I was afraid of some problems during the delivery, but in the end I couldn't escape from delivering at home*." (Peri-urban Woman_RU)

VRHS implementers understand that contracting health centres unable to provide IUDs and implants presents a challenge in achieving the project's goals. Training for health centre staff in these services is planned, although the VMA perceive this as going above and beyond their remit, as responsibility for training and providing equipment for implants and IUDs lies with the Government.

"*There is a huge need for supply side training, quality assessment and equipment provision, we can do this now… but we are a voucher project, not a safe motherhood project! That [training health centre staff] has to come from the Ministry [of Health]... The*

Ministry should have a plan and ask for money to train midwives. I like to help the Ministry but it cannot all come from one side!" (National level programme implementer)

One programme implementer suggested a possible solution:

"*Maybe we can convince the Ministry [of Health] to use more private providers, as the public sector doesn't work as we want it to*." (Provincial level programme implementer)

7.5.3 Roadblocks to voucher being accepted at facilities

Lack of need for vouchers if HEFs operational at health centres

The long-term plan for Cambodia's HEFs is to expand coverage to all primary care facilities at village level, as well as those at the tertiary level. In Kampong Thom province at the time of data collection there were 21 health centres with HEFs operating at the village level, in all three districts in the province, including in our study sites; HEFs began operating in the health centres in Kampong Thom between the end of 2010 and early 2011. Therefore women in our sample were able to go to the primary health centre and use either their vouchers or HEF cards to receive free maternal health and family planning services. In reality, some women would come with both types of cards, and if they had used their consultation coupons for short-term contraception, the service provider would allow them to use their HEF card for more contraceptive pills and injections. This may explain some of the poor uptake of vouchers, as women can receive their preferred services via HEFs rather than vouchers. Health providers expressed no particular preference or incentive for using HEFs over vouchers for claiming service costs.

Several implementers of the vouchers and the HEF vehemently maintained there was no overlap between these programmes, as they have separate financial and management systems.

"*We devised the benefit packages for each scheme. For poor women coming for family planning, safe motherhood or abortion services, the health centres will claim from the voucher programme, for all other services, the health centres will claim from the HEF. We state this clearly in a contract with health providers*." (Provincial level programme implementer)

"*Vouchers can be used once or twice for short-term contraception, after that they have to use long-term methods at* [the INGO]. *The HEF card can be used for free contraceptive and other services forever*." (Service provider)

"*With the HEF women can also get access to free FP, ANC services and medicines. But the HEF doesn't reimburse transport costs. Sometimes people bring both cards along to the health centre*." (Service provider)

"*My biggest concern is overlap. They said vouchers…will go to places where there is no HEF at the health centre, target key services, get people using them, then when HEFs get to those health centres, vouchers will move to other areas without HEF coverage. That hasn't exactly happened…We've seen people coming in with a voucher and then using an HEF card, it's confusing!*" (National level programme implementer)

Informal service costs

There is a culture of informal healthcare costs in Cambodia, in the form of 'gratitude money', 'tea money', or a tip (*sakun*) given to healthcare providers. The amount given

depends how much the client can afford. *Sakun* is often offered voluntarily by clients, although there are reports of overt demands from staff in advance of treatment, particularly at the provincial hospital. Giving *sakun* is generally perceived to result in swifter, better service.

VRHS's contract with service providers forbids the request or acceptance of *sakun*. Only one voucher user stated that service providers had requested *sakun*, whilst one urban woman voluntarily offered 30,000 Riel (US$7.5) after her delivery with a voucher, and it was accepted. Service providers acknowledged that occasionally poor clients offer *sakun*, for voucher services and others, although they refuse these payments.

"*Sometimes poor people offer 4,000-10,000 Riel (USD1-2.5) in gratitude money to staff, but we don't take it because they don't have enough money to eat.*" (Service provider)

7.5.4 Roadblocks to VPs following up with voucher beneficiaries

VPs are responsible for distributing vouchers to women, and are their main contact with the project. Part of the VPs' remit is to follow up with women who have received a voucher, to encourage them to use them if they haven't yet done so, and to find out about women's experiences if they have. However, VPs' income is from incentive payments for each voucher distributed; no payment is provided for following up with beneficiaries. This is likely to inhibit VPs' prioritisation of following up with beneficiaries versus distributing vouchers to new beneficiaries. Furthermore, whilst information on who has used a voucher is collated in the project head office in Phnom Penh and shared with provincial offices, it is not distributed to VPs.

"In May the [VMA] *reported on how many women in my villages were using the vouchers, but just this one time, apart from that they don't tell us. It is difficult as I don't know which women have used or not used their vouchers."* (District level programme implementer)

At the time of data collection, plans were in place for VPs to be salaried positions under the second phase of VRHS, rather than payment solely based on voucher distribution. This may encourage better follow-up by VPs.

7.6 Discussion

7.6.1 Summary of key findings

Programme data suggest that the majority of safe motherhood and family planning vouchers in Kampong Thom distributed between January 2011 and September 2012 were not used. Several factors were evident in contributing to women using those vouchers that had been redeemed. Vouchers removed formal and informal cost barriers to service use, increased the frequency of service use for example of ANC visits, and reduced indebtedness linked to maternal health service use. The most frequently used family planning coupon was for the first consultation, which provides access to one-off free short-term contraception (pill or injection). The study found strong evidence that these contraceptive methods were preferred by study participants.

Evidence of multiple roadblocks to voucher implementation were found, which help to explain poor voucher uptake to date. These included women forgetting the details of voucher services, a preference for non-voucher services and their affordability, prevalence of negative rumours about voucher services, seasonal migration of voucher beneficiaries away from voucher facilities, the opportunity cost of using voucher facilities, distance and transport to facilities, and the possibility of service costs being

claimed through HEFs rather than VRHS. The findings evidenced in our qualitative data complement quantitative studies which have found that vouchers targeting poor women in Cambodia increased the likelihood of a health centre delivery, but had no effect on use of ANC or PNC services (Poel et al., 2014).

7.6.2 Study limitations

Time and resource constraints made it unfeasible to conduct data collection in more than one study province. However importance was placed on selecting an 'average' province from amongst the three provinces in which VRHS is being implemented, such that findings may be as applicable as possible to other project provinces.

This paper does not focus on all stages of implementation of VRHS; rather it only focuses on those stages relating to beneficiaries' specific decision-making and care-seeking. It is possible that roadblocks or barriers exist at other stages of the implementation process, which are also having an impact on uptake of vouchers. One specific factor not covered by this paper is the quality and accuracy of poverty identification of the ID Poor programme, upon which distribution of vouchers to beneficiaries is partly based. Due to the depth of data gathered on this specific topic, this issue is investigated separately in Research Paper 2, Chapter 6, of this thesis.

7.6.3 Study findings and the existing literature

Whilst this paper discusses the low uptake of both safe motherhood and family planning vouchers in Cambodia, redemption rates were comparable to a voucher programme in Kenya, which reported a 20.1% ever use of safe motherhood vouchers, and a 2.3% ever use of family planning vouchers (Njuki et al., 2013). However, uptake of Cambodian vouchers was considerably lower than redemption rates reported in the Pakistan maternal health voucher project, which stated that 97% of first ANC coupons,

96% of delivery coupons, and 62% of family planning coupons had been used by voucher recipients (Agha, Sohail, 2011).

The current study provides some support for findings of earlier qualitative studies of reproductive health vouchers in Cambodia. Brody et al (2013) found that cost removal was an important factor in voucher use, with vouchers stimulating more frequent use of services, and prompting service use amongst those who had formally not used such services. Our study supported these findings in the case of safe motherhood, but less so for family planning. Both studies highlighted rumours of side effects linked to contraception and an on-going preference for use of TBAs and home births as important explanations of low voucher redemption. Roadblocks to voucher redemption such as poor road infrastructure and high transport costs have also been highlighted by other studies of voucher programmes (Njuki et al., 2013). Whilst barriers such as perceiving use of SBA as necessary only in the case of delivery complications, and following the advice of elders to deliver at home with a TBA have been identified in studies of reproductive and maternal health in Cambodia, not specific to vouchers (Matsuoka et al., 2010).

7.6.4 Policy and implementation implications

The evidence presented in this paper highlights four key areas where changes are needed. Firstly, loss of information by beneficiaries is a problem – women were prone to forgetting information about voucher services provided to them when they received their vouchers. If information about the services and how the vouchers worked was presented in a more straightforward and memorable way, this may have a positive impact on service uptake. In addition, incentivising follow-up visits from VPs and providing them with up to date information on which beneficiaries are still to use their vouchers is also likely contribute to improved uptake. Improvements in this area of the

project would be usefully informed by a survey exploring how much information women actually understand about the vouchers and their related services. Insights on design-centred thinking in relation to improving knowledge about essential newborn care in rural Cambodia, provide innovative examples of approaches to information dissemination (Rios et al., 2014).

Secondly, changing the cost of services at the point of use is not sufficient to effect real change in health-seeking behaviour; geographic access is also a significant barrier for rural Cambodia women. Several of the roadblocks identified in this study related to challenges in paying for transport to access voucher facilities, the time-related opportunity costs of using the services, and difficulties accessing facilities at night and in heavy rain. These findings reflect the concept portrayed by Ensor and Cooper (2004) in their model of the demand for healthcare, which posits that multiple price related factors influence demand, including the service price, opportunity costs, distance costs and the price of substitute services.

Related to this, whilst plans have been described by VRHS for training of health centre staff and provision of long-term family planning equipment to health centres, making long term contraception considerably more accessible for targeting beneficiaries, it is important to reiterate that this is paramount if substantial improvements in uptake of implants and IUDs are to be achieved. Alongside this, community attitudes towards long-term methods need to be changed, for example by sharing stories of women who have had a positive experience with these methods, dispelling erroneous negative rumours, and also by setting accurate expectations of the likely side effects, and their temporality. Ensor and Cooper (2004) also highlight community norms and preferences, social values and attitudes as key influences of demand for health services.

Thirdly, the product mix available with the vouchers, specifically family planning vouchers, does not reflect preferences for services held by beneficiaries. If vouchers were able to provide more on-going access to short-term contraceptive methods, rather than only two opportunities to receive free short-term methods via the consultation coupons, uptake would be considerably higher. Alternatively, or in addition, the range of contracted service providers is also something that should be considered regarding voucher design. As suggested by one programme implementer, engaging private providers to supply long-term contraception may increase voucher use. Women already prefer these providers, and the consequence would be focusing on a one-fold change in behaviour (the method of contraception used) rather than two-fold (changing the service provider *and* method of contraception). However, engaging private providers as contractors for reproductive health services within a voucher project is likely to be difficult, especially as in Cambodia the private health sector comprises multiple actors with varied training, is largely unregulated, and there is significant reluctance to contract private providers who also work in the public sector (so called "dual practice"). Reviewing lessons learned from successful engagement of the private sector in demand side financing interventions elsewhere would provide critical insight into appropriate strategies.

Fourthly, an important policy consideration for the future of vouchers in Cambodia is how they integrate with the wider health financing strategy. Whilst there is an argument that a voucher for specific services such as institutional delivery or contraceptive implants prompts women to use these services, a dialogue is required regarding the overlap between vouchers and primary-level HEFs, and the additional benefit that vouchers can offer, against the costs that they incur. This is of utmost importance as primary-level HEFs are now rolling out across Cambodia. More

generally, there is a need for greater harmonisation of donor funding and activity regarding targeted health subsidies in Cambodia.

These four points relate to a wider implication, that the voucher intervention has been designed and implemented without a thorough appreciation for why women don't use the services that the vouchers are trying to encourage. Several reasons are presented in this paper for why women don't use the vouchers. Such insights should be understood *before* a voucher programme is conceived, rather than retrospectively. Policymakers in other settings should take note of the importance of context and study setting before deciding whether to introduce a voucher programme or how they design the programme.

Finally, an important debate to which this paper contributes is the wider issue of whether vouchers should be used at all, in this context. This is not an issue that can be answered with the data presented here. However given the plethora of challenges related to voucher uptake in the case of VRHS, it highlights the importance of assessing cost-effectiveness of voucher interventions, an area hitherto under-researched (Glassman et al., 2013; Murray et al., 2014; Witter et al., 2012).

7.7 Conclusion

Within the international health arena, vouchers are considered an important DSF tool with the potential to improve health equity and progress towards universal health coverage by targeting services to poor and marginalised groups. This study depicts the complex challenges relating to uptake of maternal health and reproductive health vouchers in Cambodia. Whilst vouchers were reported by study participants to remove formal and informal service costs, particularly for delivery care, and offer some

financial protection for respondents, their uptake ultimately remained low, explained by the presence of multiple roadblocks to voucher implementation, including the preferences for alternative services within the target communities, difficulty accessing facilities at night and in heavy rain for women in labour, and opportunity costs of using vouchers due to the distance and time taken to reach facilities. The findings of this study present important lessons both for future phases of the VRHS project, and voucher projects elsewhere in Cambodia and further afield. An understanding of the cultural perspectives of target beneficiaries regarding services promoted through vouchers, to what extent service price and information are real barriers to service use, and the ability of local services to meet increased need generated through vouchers are critical considerations for policy-makers before substantial steps are made towards implementation.

CHAPTER 8 RESEARCH PAPER 4: IMPACT EVALUATION OF CAMBODIA'S HEALTH EQUITY FUNDS

The following chapter presents Research Paper 4, which address study objective 4 of the thesis, to conduct an impact evaluation of Cambodia's health equity funds on healthcare utilisation, financial protection, and maternal and child health outcomes. This paper contributes to the thesis aim by exploring a second intervention, in addition to the VRHS studied in Chapter 7, which aims to improve health equity by providing access to free health services for the poor. The paper provides insights in understanding the equity trends identified in Research Paper 1, by exploring whether HEFs could have contributed to the changes in health equity experienced in the last decade. The findings from Research Paper 2 on implementation of the ID Poor are also relevant to this paper, as the HEF bases distribution of its benefits in part on the outcome of the ID Poor; therefore challenges in implementation of the ID Poor also have implications for the HEF. Research Paper 3 also touches on issues that are pertinent to the context of the HEFs, such as overlap in implementation of the two interventions. This paper will be submitted to PLoS Medicine for publication.

RESEARCH PAPER 4

THE IMPACT OF HEALTH EQUITY FUNDS IN CAMBODIA: A MULTIVARIATE DIFFERENCE-IN-DIFFERENCES ANALYSIS

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RESEARCH PAPER COVER SHEET

PLEASE NOTE THAT A COVER SHEET MUST BE COMPLETED FOR EACH RESEARCH PAPER INCLUDED IN A THESIS.

SECTION A – Student Details

Student	Antonia Dingle
Principal Supervisor	Timothy Powell-Jackson
Thesis Title	Equity of access to reproductive and maternal health services – equity trends, poverty targeting and demand side financing

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
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Where is the work intended to be published?	PLoS Medicine
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Stage of publication	Not yet submitted

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary).	AD prepared the datasets, conducted the analysis, and wrote the draft manuscript. TPJ provided input into the design of the study as well as the analysis, and reviewed all drafts of the paper. Both authors approved the final manuscript.

Student Signature: _____ Date: _____

Supervisor Signature: _____Date: _____

8.1 Abstract

Introduction

Cambodia has made impressive progress in reducing maternal and infant mortality and in improving equitable access to reproductive and maternal health services over the last decade but little is known about how these gains were achieved. One potentially key intervention is Cambodia's Health Equity Funds (HEFs). Introduced in 2000, HEFs provide free or subsidised healthcare to households identified as poor, with service providers reimbursed through third party purchasers, in 44 of the 77 districts in the country. This study examines the impact of the HEFs.

Methods

Data from the nationally representative Demographic and Health Survey 2010 were linked to information on district-level introduction of HEFs. Outcome variables were generated from inclusion in the 2010 DHS of data on utilization of maternal and child health services, childhood nutritional status, haemoglobin levels in women and children, household health expenditure, and healthcare utilisation of all household members. A total of 24 outcome variables were examined, organised in three groups – financial protection, service utilisation and health outcomes. We examined whether the HEFs had an effect on outcomes by exploiting household variation in exposure to HEFs across districts and a poverty score within a difference-in-differences (DID) framework.

Results

Exposure to HEFs was associated with a 4 percentage point increase in the probability of receiving free care at any health provider, a 9 percentage point increase in the probability of receiving free care at a public health provider and a 4 percentage point decrease in the likelihood of experiencing healthcare expenditure above the 90th centile of spending amongst the uninsured. No association was found between HEF exposure

and healthcare utilisation, nor was there any effect on anaemia and anthropometric measures of health status for women and children.

Conclusion

HEFs provide some financial risk protection but show no evidence of increasing health care utilisation or health outcomes, as measured in the study. Given the interest in moving towards universal health coverage by policymakers in Cambodia, the effect of HEFs deserves greater scrutiny.

8.2 Introduction

On the eve of a post-2015 agenda for international development, there is an increasingly prevalent global call for improved health equity and social protection for the poor, as integral steps in achieving universal health coverage (Melamed, 2012; Schweitzer et al., 2012; UNAIDS et al., 2012). In this period of reflection and strategic planning for future development goals, impact evaluations and lessons learned from current social protection interventions are crucial.

Cambodia has made impressive progress in reducing maternal and infant mortality and in improving equitable access to reproductive and maternal health services over the last decade (Dingle et al., 2013). It is difficult to establish clear causality regarding policies and interventions linked to these health improvements. One potentially key intervention is Cambodia's Health Equity Funds (HEFs). The HEFs function as a social health insurance policy for identified poor households, providing free or subsidised healthcare to members, with service providers reimbursed through third party purchasers (University Research Company, 2011b). The HEFs are one of the most high profile health policies to come out of Cambodia and they are held with high regard within the region. Firm plans are underway to expand and improve HEFs across the country (Royal Government of Cambodia, 2011a). However there is limited literature on the impact of HEFs, particularly on health outcomes, whilst the methodological rigour of studies examining the HEFs varies considerably.

Flores et al (2013) conducted the only national level impact analysis of HEFs to date, using time and geographical variation in HEF operation to conduct a difference-in-differences analysis. Their study found that between 2004 and 2009 HEFs significantly reduced average household health payments per care episode (amongst those who

make a health payment) by 8915 Riel (US$2), a 42% relative reduction, for poor households. HEFs were found to reduce out of pocket (OOP) payments to public providers by 23,852 Riel (US$6), or 57%, for households who usually seek care from a public provider, and by 4757 Riel (US$1.2), or 37%, for households who usual seek care from pharmacists and drug vendors. HEFs significantly reduced the probability of seeking care in a private facility, however no other significant effects of HEFs were reported on healthcare utilisation.

To the best of our knowledge there is no substantive evidence of the impact of HEFs on objective health outcomes. Furthermore, whilst a growing body of evidence exists on the impact of health financing initiatives generally on health service utilisation, there is limited evidence of their impact on health outcomes in developing countries (Ansah et al., 2009; Gruber et al., 2014; Lagarde et al., 2009; Powell-Jackson et al., 2014). This study aims to contribute to this important evidence gap.

8.3 Method

8.3.1 Health financing in Cambodia

Cambodia is one of South East Asia's poorest countries (AusAID, 2011). Of the 14.8 million population, 80% is rural (National Institute of Statistics, 2008). In 2011 an estimated 20.5% of the population were poor (World Bank, 2013a). Poverty has decreased over the last decade due to rapid economic development, stemming from burgeoning construction, textile and tourism industries. However with this has come increasing income inequality, and it is argued that the cost of healthcare continues to pose a poverty trap for the country's poor (Jonsson, 2008).

Cambodia's health system is financed by a combination of government funding, social health insurance schemes for civil servants and formal sector workers, health equity

funds, vouchers, and government subsidy schemes for the poor, and community-based health insurance (CBHI) for informal sector workers (Annear, Peter Leslie et al., 2012). Of the schemes targeting the poor, HEFs provide the greatest coverage, in 2010 providing healthcare access to an estimated 2.5million poor people (University Research Company, 2011b). However, OOP payments on healthcare in Cambodia remain high; in 2008 government health expenditure as a percentage of total health expenditure was 24%, and of the remaining 76% of private health expenditure, 84.6% was OOP (WHO 2011).

Health Equity Funds

Health Equity Funds were initiated in Cambodia in 2000 for the benefit of the poor in the context of a user fee-heavy system (Bitran et al., 2003). The HEFs are a third-party purchasing scheme of healthcare for enrolled households, funded primarily by donor support. The funds are managed by a variety of third party organisations - HEF Operators (HEFOs) - usually local NGOs, who are responsible for reimbursing providers for service costs incurred by HEF members (Annear, Peter Leslie et al., 2012). HEFs entitle eligible households to free or subsidised care at provincial-level hospitals and in some areas to primary care at the village-level, and also to transport and food costs incurred whilst seeking healthcare. Due to the multiplicity of HEFOs, there is variation in the amount of funding within each HEF, in the benefit packages they provide, and also in the capacity of the different HEFOs to implement the programme (Bitran et al., 2003). The HEFs target poor households using the Ministry of Planning's ID Poor system of pre-identification which interviews suspected poor households on a 3-4 yearly rotating basis. A post-identification system also operates at the hospital level, such that suspected poor clients who seek care without a HEF card can be interviewed at the point of service use for eligibility for free access to services for a specific illness episode (Hardeman et al., 2004; Noirhomme et al., 2007; University Research Company,

2011b). HEFs are currently being scaled up and now operate in referral hospitals in 44 out of 77 operational districts (ODs) and cover 28% of the country's primary level health centres (Annear, Peter Leslie et al., 2012; Ministry of Health, 2010; University Research Company, 2011b).

8.3.2 Data

The study uses Demographic and Health Survey (DHS) data for Cambodia from 2010. The DHS is a nationally representative household survey of men and women aged 15 to 49 years. Outcome variables were generated from inclusion in the 2010 DHS of data on household health expenditure, utilization of maternal and child health services, healthcare utilisation of all household members, childhood nutritional status, and haemoglobin levels in women and children (NIPH et al., 2010). The survey included data on household HEF membership and asset ownership, both of which are integral to the empirical strategy pursued. The Cambodia DHS 2010 sampled approximately 15,600 households from 19 geographical sampling domains, stratified into urban and rural areas.

Outcomes

A total of 24 outcome variables were used in the study, organised in three groups – financial protection, service utilisation and health outcomes. Financial protection outcomes included the probability of zero OOP health expenditure if ill in the last 30 days, the probability of zero OOP health expenditure at a public health provider, amount of OOP health expenditure, the probability of OOP health expenditure exceeding the 90th centile of spending amongst the uninsured (individuals without HEF membership, in HEF districts and non-HEF districts), and the probability of selling assets and borrowing loans to pay for healthcare. The total expenditure variable excluded observations with expenditure in the top 0.5% of the sample, to remove

implausible values. Healthcare utilisation outcomes included use of a public health provider conditional on being sick, use of a public health provider if seriously ill (severity of illness was self-reported by participants), use of a public hospital if seriously ill, use of a private health provider, at least four ANC visits during most recent pregnancy, and institutional delivery for most recent pregnancy. Health status outcomes included binary variables and z scores for wasting (weight for height), stunting (height for age) and underweight (weight for age) of children under five years, with z scores of -2 and below indicating malnourishment (World Health Organisation, 2014b), haemoglobin levels and anaemia status for children under five, and haemoglobin levels and anaemia status for women.

Inclusion of these outcomes is premised on the following theory of change: Allocation of a HEF card to identified poor households entitles household members to free access to health services at secondary (and in some areas primary) health facilities. In doing so HEF cards remove demand side financial barriers to accessing healthcare, thereby contributing to increased use of health services. Removing demand side financial barriers also negates the need to borrow money or sell assets to pay for healthcare, and the HEFs thereby should have an impact on financial protection for beneficiary households. Free access to health services and improved financial protection for households, in stimulating increased health seeking behaviour, should then have an impact on overall health for beneficiaries, as health services are sought for an increased amount of health needs. Childhood malnutrition outcomes are included here as general indicators of overall child health. Anaemia is also included as a broad-based measure of health status. It is a sensitive measure of malaria over time as it reflects multiple infections and is particularly appropriate in a context where malaria is a leading cause of morbidity and mortality, especially in children under five years (Mathanga et al., 2010).

Data on the district-level presence of a HEF in 2010 was obtained by reviewing two comprehensive databases on implementation of HEFs in Cambodia, maintained independently by the World Bank and the University Research Company (URC). Geographical information in the DHS is based on Cambodia's administrative districts. However health-related activities in Cambodia, including implementation of the HEFs, are based around operational health districts, with different geographical boundaries to administrative districts. To link the two datasets, an operational district identifier was created for each household in the DHS data using the GPS coordinates of primary sampling units. Data on the presence of a HEF in each OD in 2010 was obtained from two databases on implementation of HEFs in Cambodia maintained independently by the World Bank and URC.

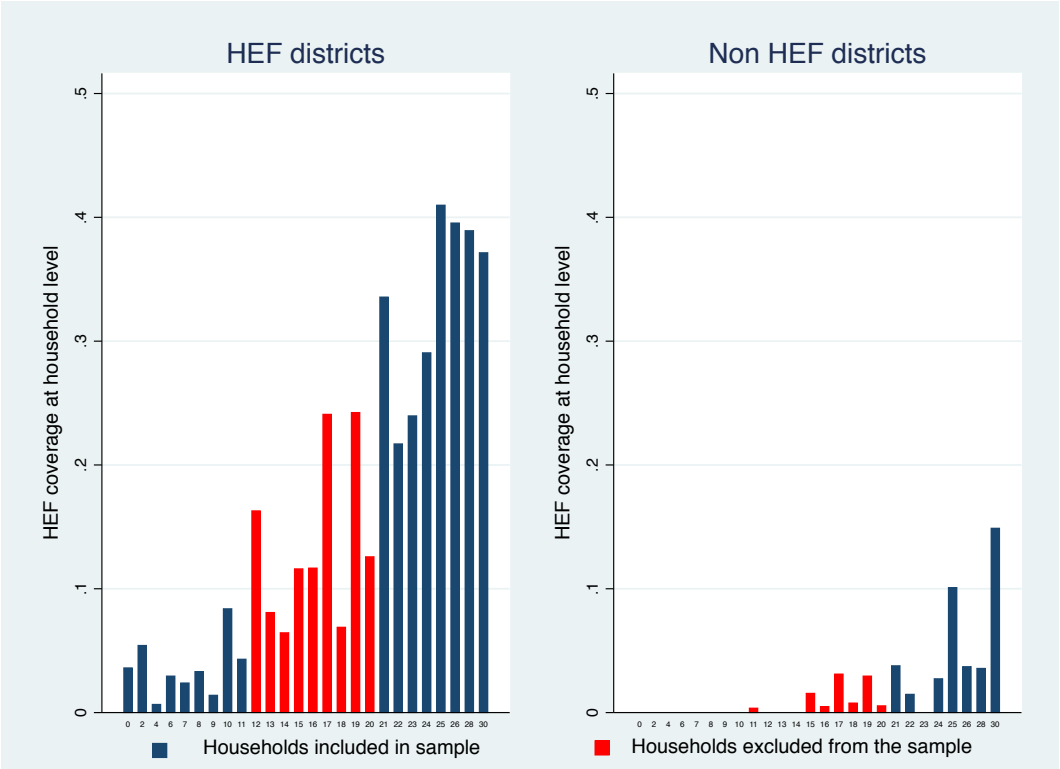
8.3.3 Selection of the sample

Our basic approach compared eligible and non-eligible households in HEF and non-HEF districts. The tool used by the ID Poor programme to assess household poverty, in principle, is the basis upon which HEF eligibility is granted. To simulate HEF eligibility for each household we used data relating to dwelling roof material, dwelling wall material, ownership of livestock and other animals, and ownership of forms of transport within the DHS to partially reconstruct the ID poor score, with values ranging from 0 (richest) to 30 (poorest). These data on asset ownership are attractive because they were not collected to evaluate poverty and are thus unlikely to have been manipulated by households seeking to be identified as poor. By contrast, the official ID poor scores are likely to suffer from manipulation as evidenced by errors in the targeting systems noted in various studies.

Figure 8.1 shows the proportion of households with HEF membership at every value of the reconstructed ID poor score. As is clear, the reconstructed ID poor score is a strong predictor of HEF membership. In districts with a HEF, poorer households (higher score) were much more likely to be HEF members than richer households (lower score). Interestingly, HEF coverage reached little more then 40 percent even amongst the poorest households (suggesting many eligible poor households are excluded from HEF membership) and some of the richest households had HEF membership (suggesting some ineligible non-poor households are erroneously included). By contrast, in districts without a HEF, coverage was low across the entire distribution of ID poor scores, except for the poorest households who may have been granted HEF membership when seeking care in neighbouring HEF districts.

We defined eligible (poor) households as those that have a poverty score greater than the official threshold used by the ID poor tool (above 20 is proportionally the same threshold). Non-eligible (rich) households were those with a score below 11, chosen after scrutinising where changes in HEF membership occurred across the reconstructed ID poor scores (see Figure 8.1). We tested our results for sensitivity to the poverty score threshold selected. Our final sample included 8715 households, of which 3495 are eligible (poor) households in HEF districts, 3201 are non-eligible (rich) households in HEF districts, 846 are eligible (poor) households in non-HEF districts, and 1173 are non-eligible (rich) households in non-HEF districts. Figure 8.1 shows roughly a 25 percentage point increase in HEF coverage between non-eligible (rich) and eligible (poor) households in HEF districts but an increase of only a few percentage points in non HEF districts. It is this variation in HEF exposure that was used to identify the effect of the programme.

Figure 8.1: HEF coverage across poverty scores



8.3.4 Statistical analysis

Descriptive analysis of HEF implementation was undertaken by tabulating for HEF and non-HEF households across the dataset, the following binary outcomes – receipt of free healthcare on last visit to any public facility, receipt of free treatment on last visit to public hospital, receipt of free treatment on last visit to public non-hospital facility, whether the HEF was the source of payment for treatment at any public sector facility, and whether the HEF was the source of payment for treatment at a public hospital. This gave us an indication of the proportions of people actually receiving free care in different types of health facilities, amongst those with HEF membership.

We tested whether the HEFs had an effect on outcomes using a difference-in-differences approach (DID) that exploited variation in exposure to HEFs across districts

and poverty score; assessing differences in outcomes between eligible and non-eligible households in HEF and non-HEF districts respectively. This is analogous to a DID analysis that more commonly exploits variation in placement of a programme over time (Khandker et al., 2010). By selecting poor and rich households who are more or less exposed to the HEF, we in essence carried out an intention to treat analysis, which we believe to be the most policy-relevant parameter of impact.

The DID analysis captured the effect of HEFs on financial protection, service utilisation and health outcomes in HEF districts, controlling for effects resulting from factors other than the intervention itself. The unadjusted model included dummy variables for poverty status, district presence of a HEF, and an interaction variable between the two. The coefficient of the interaction term is the DID estimate of impact. The data allowed us to impose tighter controls for geography and poverty, using binary variables for individual districts and each point on the poverty score within the sample thresholds, as well as controls for characteristics of households and individuals that might affect outcomes. The final adjusted model included an interaction term between district presence of a HEF and poverty status, poor score fixed effects, district fixed effects and covariates. Covariates used in the models varied according to the outcome studied, but typically included ownership of electricity, radio, tv, mobile phone, landline phone, fridge, wardrobe sewing machine, cd player, generator, watch, age of household head, education of household head, household size, rural/urban location, ownership of bank account, religion, (maternal) age, (maternal) education, child age, and parity. The coefficient of the interaction term is the DID estimate of impact. Standard errors were clustered at the district level to avoid aggregation bias in the use of microdata (Moulton, 1990).

Within a regression framework, the baseline model in DID analysis is estimated as follows:

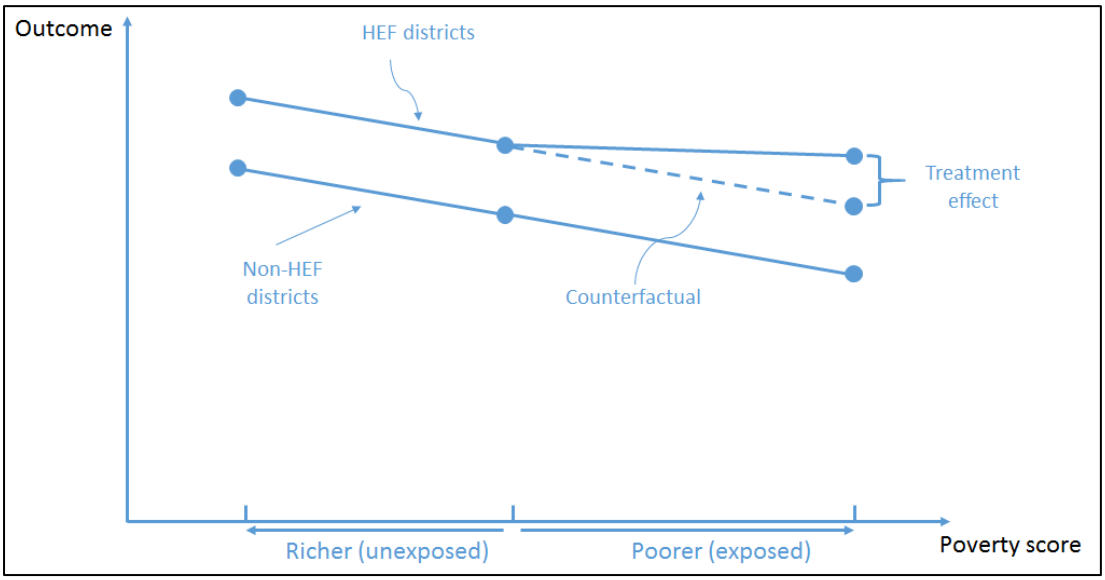
$$Y = \alpha + \beta HEF + \chi POOR + \delta HEF \times POOR + e$$

where the Y is the outcome, and the model includes a dummy variable for whether the district has a HEF, a dummy for whether the individual is poor (versus rich), and an interaction between the latter two variables. The coefficient δ on the interaction between the intervention variable *HEF* and household poverty status variable *POOR* gives the average DID effect of the intervention (Khandker et al., 2010).

The validity of DID analysis is premised on the assumption of parallel trends - that trends in exposed and unexposed populations are parallel, or change at the same rate, in the absence of the intervention under study. When this assumption holds, the DID estimator provides an unbiased estimate of the causal effect of the intervention on the study outcome. It is important to recognise that this assumption can never be formally tested. However, it is possible to provide evidence in support of the assumption through the analysis of pre-trends. This robustness check is most commonly applied when the DID analysis is examining changes over time (before and after the intervention starts) between different geographical regions (districts with and without the intervention). Using at least two periods of pre-intervention data, the robustness check tests whether the outcome trends in the intervention and non-intervention districts are parallel prior to the start of the intervention. Failure to reject the hypothesis that the pre-trends are the same provides important evidence in support of the parallel trends assumption. In the current application of the DID, an analogous robustness check is implemented. Using data on rich households only (ie. those who not eligible for the HEF), it considers whether trends by poverty score are the same in

HEF (exposed) and non-HEF (unexposed) districts. This premise is illustrated in the following diagram.

Figure 8.2 Conceptualisation of parallel trends assumption



Robustness tests were also applied by assessing sensitivity of the results to the poverty score thresholds used to define poor and rich groups, to including all outliers in health expenditure variables, and to the exclusion of operational districts in which a government subsidy scheme (SUBO) was operating was tested, and are presented in the appendix. The analysis was conducted using Stata 12.

8.4 Results

The characteristics of the sample stratified by HEF eligibility at the household level and the presence of a HEF in the district are presented in Table 8.1. Household heads and women were slightly older in non-HEF districts; education of household heads and household size was similar for HEF and non-HEF districts; non-HEF districts had a slightly larger rural population, but the difference in rural residence between rich and

poor in HEF and non-HEF districts was minimal. Differences in asset ownership between rich and poor were similar for HEF and non-HEF districts.

Table 8.1 Descriptive characteristics of households, women and mothers, Cambodia, 2010

		HEF districts			Non-HEF districts			Diff in diffs
Characteristic	**N**	**Non-eligible HHs**	**Eligible HHs**	**Diff**	**Non-eligible HHs**	**Eligible HHs**	**Diff**	
Households	8,715							
Age of household head (years)		46.89	44.83	-2.06	47.21	47.52	0.31	-2.37
Education of household head (years)		5.52	3.06	-2.46	5.67	3.46	-2.21	-0.25
Household size (people)		5.49	4.44	-1.05	5.40	4.13	-1.27	0.22
Rural residence (%)		0.73	0.79	0.06	0.77	0.82	0.05	0.01
Household assets (%)								
Electricity		0.38	0.23	-0.15	0.38	0.25	-0.13	-0.02
Radio		0.56	0.31	-0.25	0.54	0.30	-0.24	-0.01
TV		0.74	0.33	-0.41	0.85	0.45	-0.40	-0.01
Mobile phone		0.75	0.40	-0.35	0.78	0.43	-0.35	0.00
Landline phone		0.16	0.03	-0.13	0.15	0.03	-0.12	-0.01
Fridge		0.13	0.01	-0.12	0.15	0.01	-0.14	0.02
Wardrobe		0.51	0.12	-0.39	0.60	0.19	-0.41	0.02
Sewing machine		0.12	0.03	-0.09	0.13	0.04	-0.09	0.00
CD player		0.46	0.13	-0.33	0.45	0.15	-0.30	-0.03
Generator		0.54	0.27	-0.27	0.62	0.37	-0.25	-0.02
Watch		0.38	0.13	-0.25	0.38	0.13	-0.25	0.00
Bank account		0.12	0.01	-0.11	0.13	0.01	-0.12	0.01
Women	10,315							
Age (years)		29.31	29.84	0.53	29.81	30.45	0.64	-0.11
Education (years)		5.94	3.27	-2.67	6.23	3.91	-2.32	-0.35
Religion (%)								
Buddhist		0.96	0.93	-0.03	0.99	0.99	0.00	-0.03
Muslim		0.01	0.02	0.01	0.01	0.003	-0.01	0.02
Christian		0.01	0.01	0.00	0.01	0.01	0.00	0.00
Other		0.02	0.04	0.02	0.00	0.003	0.00	0.02
Mothers	6,614							
Parity (births)		3.21	3.33	0.12	3.08	3.22	0.14	-0.02
Maternal age (years)		34.91	33.66	-1.25	34.93	34.23	-0.70	-0.55
Maternal education (years)		4.86	2.54	-2.32	5.38	3.20	-2.18	-0.14

Table 8.2 presents descriptive data of the extent of implementation of HEFs. 49% of individuals with HEF membership in Cambodia who experienced illness in the 30 days before the survey received free treatment at any public health facility, compared to 17% of non-HEF households; 60% received free treatment when seeking care at a public hospital, compared to 30% of non-HEF households. 30% and 31% of HEF members reported that HEFs paid for their treatment at a public facility and a public hospital respectively.

Our analysis shows evidence of a financial protective effect of HEFs. Impact estimates show that HEF exposure was associated with a four percentage point (pp) increase in the likelihood of receiving free care at any type of health provider if ill for the poor ($p<0.001$), and with a nine pp increase in likelihood of receiving free care at a public health facility if ill ($p<0.05$), compared to the poor in non-HEF districts (Table 8.3). In addition being poor in a HEF district was associated with a four pp reduction in the likelihood of having extreme OOP health expenditure - expenditure above the 90th centile of spending amongst the uninsured ($p<0.05$). The estimated effect of HEFs on the likelihood of selling assets or taking out a loan to pay for healthcare was a four pp decrease in selling assests/acquiring loans amongst the poor in HEF districts compared to those in non-HEF districts, however the estimate was non-significant ($p=0.20$).

Table 8.2 Overview of HEF implementation - receipt of free healthcare and source of payment for healthcare for individuals reporting illness in last 30 days, by household HEF membership

	HEF households			**Non-HEF households**		
	Mean	**SD**	**N**	**Mean**	**SD**	**N**

Free treatment at last visit to any public health facility	0.49	0.50	457	0.17	0.38	1717
Free treatment at last visit to public hospital	0.60	0.49	129	0.30	0.46	600
Free treatment at last visit to public non-hospital facility	0.44	0.50	328	0.10	0.30	1117
Report HEF paid for last visit to public health facility	0.30	0.46	459	0.00	0.06	1730
Report HEF paid for last visit to public hospital	0.31	0.46	130	0.00	0.07	607

HEF exposure was not found to have a significant effect on health service utilisation at any public health provider, or at a private provider for those ill in the 30 days before the survey (Table 8.4). No significant effect was found when considering only those reporting a serious illness seeking care at any public provider and those seriously ill who sought care at a public hospital. The effect of HEF exposure on use of at least four ANC visits during pregnancy and on institutional delivery was small and non-significant.

HEF exposure did not have a statistically significant effect on any malnutrition outcomes in children under five years (Table 8.5). The estimated effect sizes for wasting and underweight were both small and negative, in the expected direction, indicating that wasting and underweight were slightly less amongst poor children in HEF districts, compared to non-HEF districts. The effect size for stunting was also small, but positive, indicating that poor children in HEF districts were slightly more stunted than those in non-HEF districts. In addition, no significant effect was found of HEFs on haemoglobin level and anaemia status for children under five years and for

women; the effect sizes were small and negative, suggesting that anaemia was slightly higher amongst the poor in non-HEF districts compared to those in HEF districts.

We performed several robustness tests, the results of which are presented in the Appendices. Testing the assumption of parallel trends found that outcomes were similar for rich participants without access to the intervention across exposed (HEF) and unexposed (non-HEF) districts. These findings help to validate the DID effect estimated here (see Appendix 13). We found no change in the findings on financial protection outcomes when we included expenditure outliers in the sample (see Appendix 14). Altering the sample poverty score thresholds used to designate rich and poor groups had little to no effect on all study outcomes; the size of the effect of HEFs on likelihood of receiving free care at a public provider increased when a more extreme poor and rich sample was used (see Appendix 15 and 16). Excluding districts with SUBOs from the sample resulted in a non-significant effect of HEFs on the likelihood of health expenditure being above the 90th centile of those who are uninsured, with a change in the effect size of -0.01 to -0.03 (p=0.17); all other effects remained the same (see Appendix 17).

Table 8.3 Impact of HEFs on financial protection

Financial protection outcomes	N	HEF districts			Non-HEF districts			Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
		Non-eligible HHs	Eligible HHs	Difference	Non-eligible HHs	Eglible HHs	Difference		
Total expenditure at any health provider in last 30 days, if ill (USD)	4244	41.57	24.51	-17.06	33.67	22.82	-10.85	-6.216	-7.345
								(-32.02 , 19.58)	(-28.09 , 13.40)
Probability of zero expenditure at any health provider if ill in last 30 days	4244	0.01	0.05	0.04	0.01	0.01	0.00	0.04	0.044
								(0.02 , 0.06)	(0.01 , 0.07)
Probability of zero expenditure at a public health provider if ill in last 30 days	1277	0.02	0.12	0.10	0.01	0.04	0.02	0.078	0.087
								(0.02 , 0.13)	(0.02 , 0.16)
Probability of out of pocket health expenditure exceeding 90th centile of spending amongst uninsured, if ill	4244	0.11	0.06	-0.05	0.08	0.05	-0.03	-0.026	-0.04
								(-0.07 , 0.01)	(-0.08 , -0.004)
Probability of selling assets and borrowing loans with interest to cope with healthcare costs	4252	0.18	0.17	-0.01	0.11	0.15	0.04	-0.056	-0.04
								(-0.12 , 0.01)	(-0.10 , 0.02)

Table 8.4 Impact of HEFs on health service utilisation

Healthcare utilisation outcomes	N	HEF districts			Non-HEF districts			Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
		Rich	Poor	Difference	Rich	Poor	Difference		
Public health provider sought if ill in last 30 days	4249	0.31	0.35	0.04	0.24	0.30	0.05	-0.009	-0.001
								(-0.10 , 0.08)	(-0.11 , 0.11)
Public health provider sought if seriously ill in last 30 days	682	0.37	0.47	0.10	0.49	0.45	-0.04	0.14	0.17
								(-0.04 , 0.32)	(-0.05 , 0.39)
Public hospital sought if seriously ill in last 30 days	682	0.21	0.27	0.06	0.34	0.29	-0.05	0.114	0.129
								(-0.08 , 0.30)	(-0.08 , 0.34)
Private health provider sought if ill in last 30 days	4249	0.62	0.52	-0.10	0.67	0.57	-0.10	-0.006	0.009
								(-0.07 , 0.06)	(-0.07 , 0.09)
4 plus ANC visits during most recent pregnancy	3581	0.64	0.46	-0.17	0.68	0.49	-0.19	0.017	0.005
								(-0.08 , 0.11)	(-0.08 , 0.09)
Institutional delivery for most recent pregnancy	4655	0.57	0.42	-0.15	0.59	0.47	-0.12	-0.018	-0.003
								(-0.12 , 0.08)	(-0.07 , 0.07)

Table 8.5 Impact of HEFs on health outcomes

Healthcare status outcomes	N	HEF districts			Non-HEF districts			Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
		Rich	Poor	Difference	Rich	Poor	Difference		
Wasting of children under 5 years	2041	0.11	0.12	0.00	0.10	0.11	0.01	-0.008	-0.017
								(-0.08 , 0.06)	(-0.10 , 0.07)
Wasting of children under 5 years, z score	2041	-0.62	-0.70	-0.08	-0.73	-0.75	-0.02	-0.06	0.02
								(-0.26 , 0.15)	(-0.21 , 0.25)
Stunting of children under 5 years	2041	0.35	0.47	0.12	0.31	0.36	0.06	0.063	0.048
								(-0.04 , 0.17)	(-0.06 , 0.15)
Stunting of children under 5 years, z score	2041	-1.55	-1.84	-0.29	-1.44	-1.68	-0.24	-0.06	-0.003
								(-0.32 , 0.21)	(-0.27 , 0.26)
Underweight of children under 5 years	2041	0.26	0.31	0.04	0.27	0.32	0.05	-0.006	-0.041
								(-0.09 , 0.08)	(-0.13 , 0.05)
Underweight of children under 5 years, z score	2041	-1.32	-1.55	-0.23	-1.33	-1.47	-0.14	-0.09	0.01
								(-0.27 , 0.10)	(-0.20 , 0.22)
Haemoglobin level of children under 5 years, g/dl	2313	128.23	125.24	-2.99	126.80	127.75	0.95	-3.937	2.791
								(-21.37 , 13.49)	(-14.39 , 19.97)
Anaemia status of children under 5 years	2294	0.44	0.48	0.05	0.45	0.48	0.03	0.017	-0.003
								(-0.13 , 0.17)	(-0.16 , 0.16)
Haemoglobin level of women 15-49 years, g/dl	4990	120.67	119.10	-1.57	120.98	117.82	-3.16	1.589	1.135
								(-1.93 , 2.92)	(-1.26 , 3.53)
Anaemia in women 15-49 years	4996	0.42	0.48	0.06	0.43	0.51	0.08	-0.018	-0.013
								(-0.09 , 0.06)	(-0.09 , 0.07)

8.5 Discussion

8.5.1 Summary of key findings

The DID analysis produced evidence of some financial protection against healthcare costs for eligible (poor) households in HEF districts, with a four pp greater likelihood of receiving free care at any health provider, compared to eligible households in non-HEF districts, a nine pp greater likelihood of receiving free care at a public health provider, and four pp lower likelihood of experiencing extreme healthcare expenditure, above the 90th centile of spending amongst the uninsured. We found no impact of the HEFs on health service utilisation and no impact on health outcomes.

8.5.2 Interpretation

Several factors can explain the lack of impact of the HEFs on utilisation and health outcomes found in our analysis. The first relates to implementation of the HEFs. Descriptive analysis presented in Table 8.2 indicates that HEF implementation may not be functioning optimally. For example, of all HEF households, only 60% received free treatment at their last visit to a public hospital, and just 31% stated that HEFs paid for their treatment at their last visit to a public hospital. There are several explanations for this: Firstly, these data indicate a shortage in the depth of coverage of the HEFs, regarding the extent to which they cover public sector services. 72% of primary health care facilities are currently not covered by the HEFs. It is also possible that HEF members are either not inclined to show their cards at facilities, possibly because of fear of poor treatment if identified as poor, and/or that providers are failing to grant free treatment even on presentation of HEF cards, including as a result of charging informal payments for services. There is also variation in the proportion of subsidy that HEF members are eligible for; not all HEF members are entitled to a 100% subsidy for healthcare, with some HEFOs granting a partial subsidy to less poor households (e.g. 50% or 75%). We do not have data to determine the proportion of HEF members with

full versus partial subsidy entitlements. That only a proportion of poor households in HEF districts received free care at public facilities will reduce the impact of the HEFs.

Secondly, our sample was structured on an intention to treat basis; all poor households in HEF-districts were included in the eligble group, regardless of whether or not they had HEF membership or had used it to access health services. It is possible with such a design that individuals in the intervention group may not have utilised the intervention under study. Some of the lack of impact of the HEFs could be due to households not using their HEF cards to access services, or not needing to use health services, even if they had the cards. However, an intention to treat estimate is the most policy relevant approach approach, as it reflects the actual impact of the intervention on the ground. Furthermore, our approach of using simulated eligibility will be less likely to lead to biased estimates than if we had used actual membership, because of selection issues related to allocation of ID Poor and HEF cards.

Related to both the above points, qualitative analysis conducted as part of this PhD found some evidence that households do not tend to use their HEF cards for small or non-severe illnesses, which could include mild cases of anaemia and malnutrition. This is explained as due to the long distance to district or referral hospitals where HEFs are operating, or the inconvenience of using village-level public services because of limited opening hours, the perceived poor quality of services and lack of equipment and facilities at village health centres for treating routine illnesses. This culminates in a preference for using private providers and/or market based drug vendors to treat common health problems, even for those with HEF cards. As discussed above, another factor that may inhibit the use of HEF cards is the experience or anticipation of bad treatment from facility staff on being identified as poor, particularly at hospital level facilities. Qualitative research in this PhD found some evidence that such experiences influenced use of HEF cards.

Thirdly, whilst we found no effect of HEFs on service use amongst those reporting a serious illness, the point estimates for these outcomes were relatively substantial, but imprecisely estimated. Therefore lack of power in the sample could have resulted in a non-significant effect. This is consistent with the notion that HEF cards are utilised more in the event of serious illnesses incurring high costs, rather than for routine illness. Whilst we lacked power in some outcomes in our study to detect small effects of the HEFs, we can rule out modest to large impacts of HEF on our outcomes.

Lastly, it is evident that coverage of HEFs in 2010 was patchy; in some districts HEFs included use of primary health services, but not everywhere, whilst different HEFOs provided different levels of subsidies for extreme and near poor households, and the packages of services covered by the HEFs can also vary. This is likely to have affected the analysis indicating little impact of HEFs on our outcomes. For example, childbirth is an expected and high-cost event, such that we would anticipate a positive impact of HEF membership on institutional delivery. Dingle et al (2013) report a strong positive trend in increased institutional delivery in Cambodia over the last decade, including for the poor, indicating that poor women are using delivery services. The non-significant effect found in our analysis could be the result of the low proportion of HEFs currently operating in village health centres, where most institutional deliveries take place, particularly for rural populations. Referrals to hospitals typically occur in the event of a complication, affecting fewer individuals, for which the sample may not have been large enough to detect an effect.

Our results support the findings of Flores et al (2013) who also report a financially protective effect of HEFs on Cambodia's poor. Flores et al did not find a significant effect of HEFs on healthcare utilisation apart from a small negative effect of HEFs on likelihood of using private facilities. They did not include health outcomes in their

study. Our findings also support the broader evaluation literature on health financing schemes in developing countries, which generally find little evidence of impact on objective health outcomes (Ansah et al., 2009; Lagarde et al., 2009; Miller et al., 2013; Powell-Jackson et al., 2014). Several studies report a positive effect of health financing schemes on the financial risk protection of members, for example through reduced out-of-pocket health payments, or reduced catastrophic health payments (King et al., 2009; Miller et al., 2013; Powell-Jackson et al., 2014). Whilst some studies find a significant positive impact of schemes on health service utilisation (Ansah et al., 2009; Lagarde et al., 2009; Miller et al., 2013; Powell-Jackson et al., 2014), others do not (King et al., 2009; Lagarde et al., 2009).

8.5.3 Limitations

The study has several limitations. First, our measure of the ID Poor score is likely to contain some measurement error as it is only a partial replication of the ID Poor score used to assess poverty status on the ground. While all available data were used to construct our partial poverty score, the DHS did not contain sufficient information to completely replicate the ID-Poor poverty score. As our analysis is concerned with outcomes in households eligible for HEFs compared to those in non-eligible households, we chose a poverty measure that approximated the ID-Poor as closely as possible, as this is the mechanism with which HEF membership is allocated. We found our measure to be highly correlated with HEF membership. That there is no sharp discontinuity in HEF membership at the poverty threshold is to do with exclusion errors is allocation of HEF benefts, of which there is substantial evidence, rather than to do with our measure.

Secondly, allocation of the sample to the non-eligible (rich) group was conducted based on partially arbitrary application of poverty score thresholds. We removed households in the middle of the poverty score range from the sample, retaining those at the lower

and upper end of the spectrum as non-eligible and eligible groups respectively. This provided a clear delineation between groups in our sample based on poverty status, which was important for detecting effects of HEF membership on outcome variables, as inclusion errors in allocation of HEF membership have resulted in a relatively large number of non-eligible households with HEF membership and a blurring of the line between eligible and non-eligible (World Bank, 2012a)(also see Research Paper 2, Chapter 6). Our eligible (poor) group were defined according to the threshold used in the ID Poor idenfitication tool. We tested for the sensitivity of our results to the poverty score thresholds used, and found this to have minimal effect.

Finally, as with any quasi-experimental approach, our estimates are vulnerable to the presence of unobserved differences between treatment (HEF districts) and control (non-HEF districts) groups. However in our sensitivity analysis we found no evidence of divergence in outcomes between non-eligible households in treatment and control groups, suggesting that the assumption underpinning our analysis is likely to hold.

8.5.4 Implications

The analysis conducted in this study, and evidence from other studies, suggest there are implementation challenges with HEFs in Cambodia, both in targeting and in the provision of benefits to HEF members. This is the case despite HEFs having been in operation for more than a decade now. Errors in targeting of HEFs to poor households are likely to negatively affect the potential impact of HEFs for the poor. Improved targeting and minimising of inclusion and exclusion errors should remain an on-going priority for Government, HEFOs and monitors of the HEFs.

The evidence suggests that HEFs are providing some financial protection for members; this is their main benefit and lends weight to the current focus on expanding HEF coverage. However, given the lack of effect of HEFs on service utilisation and health

outcomes, HEFs are unlikely to have contributed significantly to the recent improvements in use of reproductive and maternal health services amongst the poor in Cambodia, as documented in Dingle et al (2013).

HEFs have been scaled up across many districts now, and also down to village level services. If distance and access to tertiary facilities precludes use of HEFs for all but the most serious of health problems, expansion to primary level facilities may result in an improved effect on service use and health outcomes in the future. However if concerns over service quality, particularly at the village level, dissuade more regular use of HEFs for routine and minor illnesses, this will continue to stem the potential impact of HEFs at both primary and tertiary facilities on health outcomes.

CHAPTER 9 DISCUSSION

This chapter brings together the findings from the four pieces of research conducted within the thesis, each addressing one study objective, which between them explore the issues of equity of access to reproductive and maternal health services and health financing in Cambodia. The first objective of this thesis aimed to generate a detailed understanding of past and current trends in health equity in Cambodia, whilst Objectives 2-4 between them attempt to provide insight and understanding into the factors behind these trends, what could be driving them, and specifically the contribution of two important health financing initiatives in Cambodia, the VRHS project and HEFs. As the research papers contained within Chapters 5-8 already include detailed discussions of the individual pieces of research, the aim of this chapter is not to repeat what is discussed there, but rather to go beyond this, drawing together the findings as a whole.

9.1 Main findings

The equity analysis detailed in Chapter 5, Results Paper 1, estimated horizontal (in)equity in access to six reproductive and maternal health services – family planning, antenatal care (ANC), skilled birth attendance (SBA), facility-based delivery (FBD), postnatal care (PNC) and safe abortion – in Cambodia between 2000 and 2010. The analysis found that substantial progress has been made over the study period, both in increasing the use of reproductive and maternal health services and in improving equity. Inequity in service use had progressively decreased over time or remained stable at a low level for all services except PNC, which became slightly more inequitable over the study period. Although FBD remained the service with the greatest inequity in 2010, it also saw the largest improvement in equity over time. Met need for family planning and use of abortion by skilled provider were almost perfectly equitable in

2010. Inequity in service use was also greater within urban areas than within rural areas.

This paper is the first of its kind to estimate equity in use of a spectrum of reproductive and maternal health services in Cambodia, from ANC through to PNC as well as met need for FP and safe abortion care, using data from an entire decade. It also contributes to the wider literature documenting the existence of inequity in use of reproductive and maternal health services in developing countries, generally portraying a common trend of wealthier, urban, more educated women using services more than those who are poorer, rural and less educated. The paper uses robust and recommended methods for analysing health equity, concentration curves and indices, which are less commonly used in the existing literature. It is novel amongst studies of this kind as the analysis incorporates four different methods of health equity, and two different measures of socio-economic status (wealth and maternal education) to produce a thorough depiction of reproductive and maternal health equity in Cambodia.

The three subsequent research papers were designed to interpret the trends identified above, by understanding how and why they have developed in this way. Cambodia's national poverty identification system, the ID Poor, is integral to any consideration of health equity in Cambodia, as it is the mechanism by which those households most in need of support are identified, such that benefits can be distributed to them. Results Paper 2 in Chapter 6, explored the perceptions, experiences and accuracy of Cambodia's ID Poor programme. The research suggested that diverse perspectives were held of the ID Poor; whilst some participants expressed their satisfaction with the programme, criticisms of it being unjust were also made. There was the indication that whilst people were aware of errors within the ID Poor, they either didn't want to complain about them or were prepared to tolerate them. There was widespread acknowledgement of both inclusion and exclusion errors, for which multiple reasons

were given, particularly lack of sensitivity of the identification tool to the current living standard of the poor; domestic and international migration of the poor; lack of coverage of the urban poor; corruption and nepotism of local authorities; and a mismatch between the frequency of change in household poverty status and the frequency of poverty identification. Evidence of the effective operation of the community verification component of the ID Poor was limited, with programme implementers acknowledging that this needs strengthening and monitoring.

This paper contributes to the evidence base on different approaches to identifying the poor, specifically in Cambodia but also in other developing countries. Its consideration of the ID Poor from the perspective of a framework of targeting mechanisms and methods provides practical insights into the relative benefits and drawbacks of alternative approaches. This is particularly relevant in light of Cambodia's most recent poverty report, which highlights the extreme vulnerability of the large population living just above the poverty line (World Bank, 2013a). The paper illustrates that there is little difference in living standards between poor and average households and as such it is easy for households to move in and out of poverty. These critical dynamics of poverty in Cambodia must be considered if the current system of poverty identification is to be improved and benefit more of the most vulnerable households.

One intervention in Cambodia aiming to directly improve inequity in reproductive and maternal health is the Vouchers for Reproductive Health Services (VRHS) project, which utilises the ID Poor to distribute vouchers to poor women. The research detailed in Chapter 7, Research Paper 3, addressed Objective 3 of the PhD by exploring the reasons for low-uptake of reproductive and maternal health vouchers within the VRHS Project. Analysis of quantitative data from VRHS in this study found that the majority of safe motherhood and family planning vouchers in Kampong Thom distributed between January 2011 and September 2012 were not used. Through analysis of

qualitative data, evidence of multiple roadblocks to voucher implementation were found, which help to explain this poor voucher uptake. These included women forgetting the details of voucher services, an underlying preference for non-voucher services, the affordability of alternative services, prevalence of negative rumours about voucher services, seasonal migration of voucher beneficiaries away from voucher facilities, the opportunity cost of using voucher facilities, distance and transport to facilities, and the possibility of service costs being claimed through HEFs rather than VRHS. Despite the overall low uptake of vouchers, there was evidence that safe motherhood vouchers were well received and appreciated by women and potentially influential in the decision of where to give birth, and how many ANC visits to have. There was also some qualitative evidence that safe motherhood vouchers are viewed as a way to reduce the costs related to use of maternal health services for recipients.

This paper represents one of few studies to qualitatively explore implementation of VRHS after an extended period of implementation. It differentiates between factors influencing the uptake of reproductive and maternal health vouchers respectively, as these varied for the different services, which an earlier study of VRHS did not do. It contributes to the evidence base on DSF interventions, and vouchers specifically, by providing detailed insights into the successes and challenges of implementing a voucher project, with recommendations of improvements to the project with the potential to increase voucher redemption in the future.

The second health financing intervention explored in the thesis which also uses the ID Poor to identify beneficiaries is Cambodia's health equity funds (HEFs). The research detailed in Chapter 8, Research Paper 4, addresses Objective 4 of the PhD and estimates the impact of Cambodia's HEFs using a difference-in-differences analysis. Descriptive statistics from a nationally representative household sample indicate that implementation of HEFs has been incomplete, with a large proportion of HEF members

not benefitting from free care through the HEFs. For poor households exposed to the HEFs, we found some evidence of financial protection against healthcare costs. While controlling for key confounders, households with high exposure to HEFs (poor households in HEF districts) were 4 percentage points (pp) more likely to receive free care at any health provider, 9 pp more likely to receive free care at a public health provider, and 4 pp less likely to experience extreme healthcare expenditure. However HEF exposure was not found to have a significant effect on health service utilisation. The effect of HEF exposure on use of at least four ANC visits during pregnancy and on institutional delivery was small and non-significant. HEF exposure did not have a statistically significant effect on any malnutrition outcomes in children under five years. In addition, the effect of HEF exposure on haemoglobin level for children under five years and women was small, positive and non-significant, and the effect of anaemia status was small, negative and non-significant.

Understanding the reasons why we find no effect on healthcare utilisation and health outcomes invariably involves some speculation. What we do know, however, is that the HEFs do not appear to have been extensively implemented as indicated by the low proportion of HEF members who get free care when they seek care in the public sector. This suggests that HEFs suffer from some implementation problems and poor depth of coverage of services, for example as primary level services are not covered by HEFs in all districts. The diversity of HEFO institutions implementing HEFs also results in slightly different services packages across HEFOs/districts, and payment methods etc. This risks producing a degree of fragmentation across the intervention.

These results support the findings of Flores et al (2013) who also report a financially protective effect of HEFs on Cambodia's poor. Flores et al did not find a significant effect of HEFs on healthcare utilisation apart from a small negative effect of HEFs on likelihood of using private facilities. They did not include health outcomes in their

study, which, along with financial protection, is the ultimate issue of interest regarding the impact of HEFs. Several studies have, contrary to the findings presented here, reported that HEFs have had a positive impact on service utilisation (Annear, Peter, 2010; Bitran et al., 2003; Hardeman et al., 2004; Ir et al., 2010a; Noirhomme et al., 2007). However, these studies used descriptive methods, failing to take into account confounding and with an absence of robust approaches to comparing outcomes in HEF and non-HEF samples. Therefore this paper contributes to the extremely limited literature assessing the impact of Cambodia's HEFs using robust statistical approaches, and is the first of its kind to include reproductive and maternal health service utilisation and objective health outcomes as part of the analysis.

9.2 Synthesized findings: Revised conceptual frameworks

Taken together, the results of this thesis provide an insight into the complexity of health equity as a concept, and the challenges in improving reproductive and maternal health equity, from a demand side perspective. Firstly, how you define who is poor or the most vulnerable, in order to improve access to services for this group is a matter for debate; a multiplicity of perspectives can be taken on this, depending on the nature of poverty in the context in question. For example, in Cambodia whilst the size of the population living in poverty is reducing, there is a sizeable population that whilst not technically poor, remain extremely vulnerable. The needs of this group must also be addressed if health equity is to be achieved. Secondly, once agreement has been reached on who requires support in a bid to improve health equity, how you identify specifically who those people are, the package of services you offer them, how that package is incentivised and delivered, where it can be accessed, the attitudes and perceptions held by the beneficiaries regarding the available services, and the quality of health facilities are also critical factors that will determine whether those services are actually used by intended beneficiaries and whether this in turn will improve health equity. The ID Poor and VRHS have been found to be suffering from several critical

implementation issues. These can be understood as contributory factors in the low uptake of vouchers. A lack of any significant effect of HEFs on health service utilisation and health outcomes also indicates severe implementation challenges within the HEFs. However, the equity analysis conducted suggests that Cambodia is increasingly experiencing improvements in reproductive and maternal health equity. The cumulative interpretation of the research conducted here suggests that many other factors are likely to be at play than merely the ID Poor, VRHS or HEFs which can explain these developments.

Conceptual frameworks from health economics and social epidemiology, drawn on at the start of this thesis, suggest that service price is an important component in determining demand for health services. These frameworks also argue that other aspects of price beyond merely service price (e.g. price of substitute services, opportunity costs), as well as household, community, social, cultural, economic and political factors between them all exert an influence on our health-seeking behaviour. This complex web of interacting determinants in turn affects the distribution of health within a population, thereby influencing health equity. The findings presented here support the existence of such dynamics in the context of seeking reproductive and maternal healthcare in Cambodia. The reasons for poor uptake of vouchers that removed the price of services are particularly enlightening, and illustrate that distance to facilities, the cost of transport, childcare arrangements, work obligations, foregone income, social attitudes towards the available services, service quality and capacity, traditional cultural practices regarding pregnancy and childbirth, sources of trusted advice and information within the community regarding what services to use, education, power and decision-making dynamics within a household, all affect whether a woman will change her previous behaviour and go to a health centre to receive free health services. Given this, it is evident that a mechanism to remove service price, whilst a key component of health-seeking behaviour, appears insufficient to have an

effect on healthcare utilisation; it must be implemented in the context of pressure also being exerted on, at least several, of the factors outlined above. It is not necessary for DSF interventions alone to initiate such pressures, some will occur for example as part of supply-side improvements within the health system, or as a result of developments in infrastructure, changes in education policy and the economic development of the country. However what this serves to demonstrate is the complexity in understanding exactly what the key factors are that change health-seeking behaviour, where within the socio-economic, political, cultural, household or individual layers of society they emanate, and to what extent they are sufficiently active in order to capitalise on the additional benefits of a DSF intervention removing price-related barriers to service use.

In light of the findings of this thesis, the conceptual frameworks drawn on in Chapter 4 have been revisited, and a single revised framework developed to represent the determinants of reproductive and maternal health and health (in)equity in Cambodia. This is presented in figure 9.1 below. This revised framework illustrates the multiplicity of factors that contribute to the distribution of reproductive and maternal health in Cambodia. The framework is made up of structural distal factors, policy interventions, social distal factors, and proximate factors, which between them all influence the distribution of reproductive and maternal health.

Structural distal factors include those related to government policy, governance structures, the health system; these are elements of the State present within the lives of Cambodians which have a substantial influence over their reproductive and maternal health, however they are generally top down systems, and over which individuals have minimal control. Specific policy interventions, whilst linked to structural distal factors, are represented separately in the framework, such as health financing schemes and the identification of the poor. Qualitative research highlighted a link between the shift in women's perspectives and practice of delivering at local health centres, which began in

the early to mid 2000s, and the Government imposed ban on home births. Voucher schemes designed by international donors, health consultancies and NGOs are removing user fees for reproductive and maternal health services for the poor, and in theory this has a direct impact on health-seeking behaviour. The Government maternity incentive scheme, which since 2007 has been providing cash payments to health facilities for every institutional delivery, will also have been directly influencing health facility staff to encourage women to deliver at health centres. These are all examples of structural distal factors and specific policy interventions that play a role in the distribution of reproductive and maternal health in Cambodia.

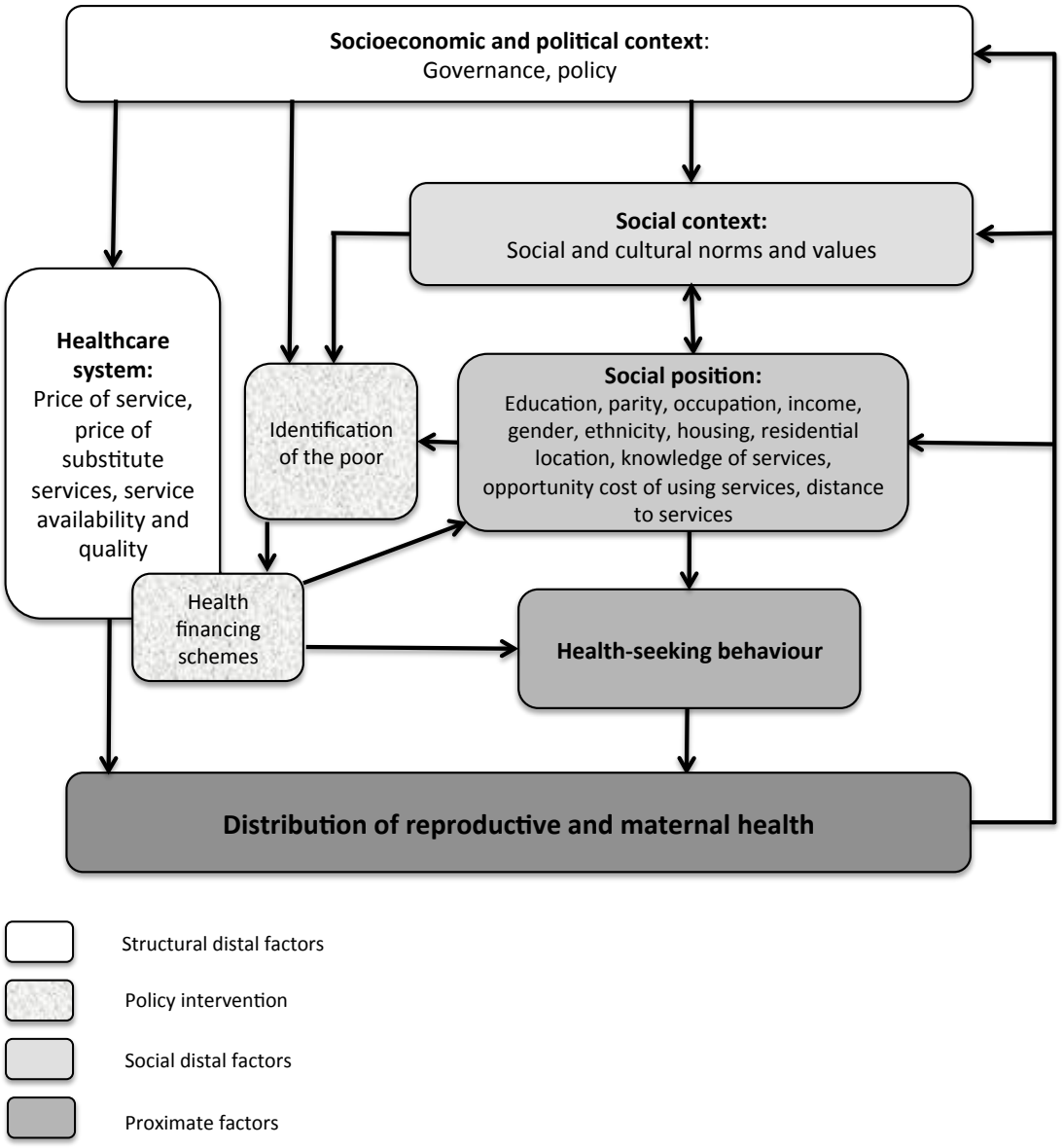


Figure 9.1 Determinants of reproductive and maternal health and health (in)equity

Social distal factors relate to the social context within which an individual exists, cultural norms, attitudes and values, one's social milieu. These are portrayed as separate to structural distal factors as they encompass more of an organic evolution in their development; communities and individuals directly influence and develop the social context in which they live. Social distal factors are also distinct from structural distal factors in that their composition will vary for different groups within society; it is possible to conceive of a spectrum of social contexts which create part of the foundation of individuals' lived realities, largely depending on their social position, however structural distal factors that individuals experience will be more common across society as they are produced from within government, donor and civil society organisations, rather than from within communities themselves.

Women's attitudes towards long term methods of contraception such as the implant and IUDs, explored in qualitative research in Kampong Thom, is a good example of the presence and impact of social distal factors. Women were strongly influenced by rumours and stories circulating amongst their friends and community members, which portrayed these contraceptives as likely to induce discomfort and pain, limiting their ability to do their work, and generally being undesirable. This, in turn, affected women's likelihood to use such devices, even if they were available free of charge. The social perceptions of these methods for poor women in the communities under study were markedly different from the perceptions held by more educated midwives and nurses working in the health facilities, who understood that any negative side effects would be temporary and that no long term health problems would be incurred as a result of their use. These differing attitudes can be understood as part of the respective social contexts of these different groups, which are in part developed by the attitudes of others within their social network.

Proximate factors relate specifically to individual social position, these factors are influenced by and in turn influence the social context of a particular individual and their community. It is this group of factors that has a direct influence on health seeking behaviour and in turn, health equity. The studies presented in this thesis have detailed evidence of the financial protection provided by health financing schemes such as vouchers and HEFs for beneficiaries, and also the increased knowledge and awareness about health services that comes with women's enrolment in the schemes. In this regard health financing schemes are able to exert an influence on individual social position.

Many of the poor women interviewed in the qualitative components of the PhD had little if any education and worked doing menial labour or in agricultural roles, farming rice, looking after cattle, or making bricks in a factory. Their work demanded many hours of their time and was essential in order for their family to generate enough money for them to eat each day. These women's daily work often prevented them from attending the public health centre for reproductive or maternal health services, as the short facility opening hours were generally during their working hours, and the facility was also sufficiently far enough away from their house and work to make it inconvenient and costly for them to get to. This example illustrates how women's individual social position has a direct bearing on their demand for and ability to use healthcare, and therefore, on the distribution of healthcare within the community and society. As one's social position is specific to each individual, the influence that these factors have on health-seeking behaviour will vary from person to person. This also demonstrates the interaction between structural distal factors like health system infrastructure and proximate factors of individual social position.

A feedback loop in the framework illustrates how the current distribution of reproductive and maternal health can influence future structural distal, social distal

and proximate factors. The extent of health equity in Cambodia can be seen to impact on policy, improvements and developments within the health system, as well as on the wider social context of individuals and communities, and one's social position. Acknowledgment of the presence of persistent health inequity can result in policy change to try and improve access for those currently at a disadvantage; greater use of services by the poor will affect the social context of those groups and will influence collective perceptions and attitudes towards their use; whilst increasing service use may improve an individual's overall health status, enabling them to work more, earn more, reduce the number of children they have to care for, and keep those children in school longer rather than requiring them to work to support the family, directly affecting their individual social position.

Based on this conceptualisation of the determinants of equity in reproductive and maternal health in Cambodia, it was also possible to develop insights into the various roadblocks which are affecting implementation of both the ID Poor and VRHS projects, both of which are designed specifically to improve health (and other) equity. Following the research conducted to address objectives 2 and 3 of the PhD, process diagrams of the implementation of the ID Poor and VRHS (see Figure 4.4 in Chapter 4) were adapted to illustrate key roadblocks that became apparent through qualitative research – see figure 9.2 below. Evidence of some form of roadblock was found at every stage of the ID Poor and VRHS implementation that was explored as part of the qualitative research, which impeded effective implementation and uptake of the programmes.

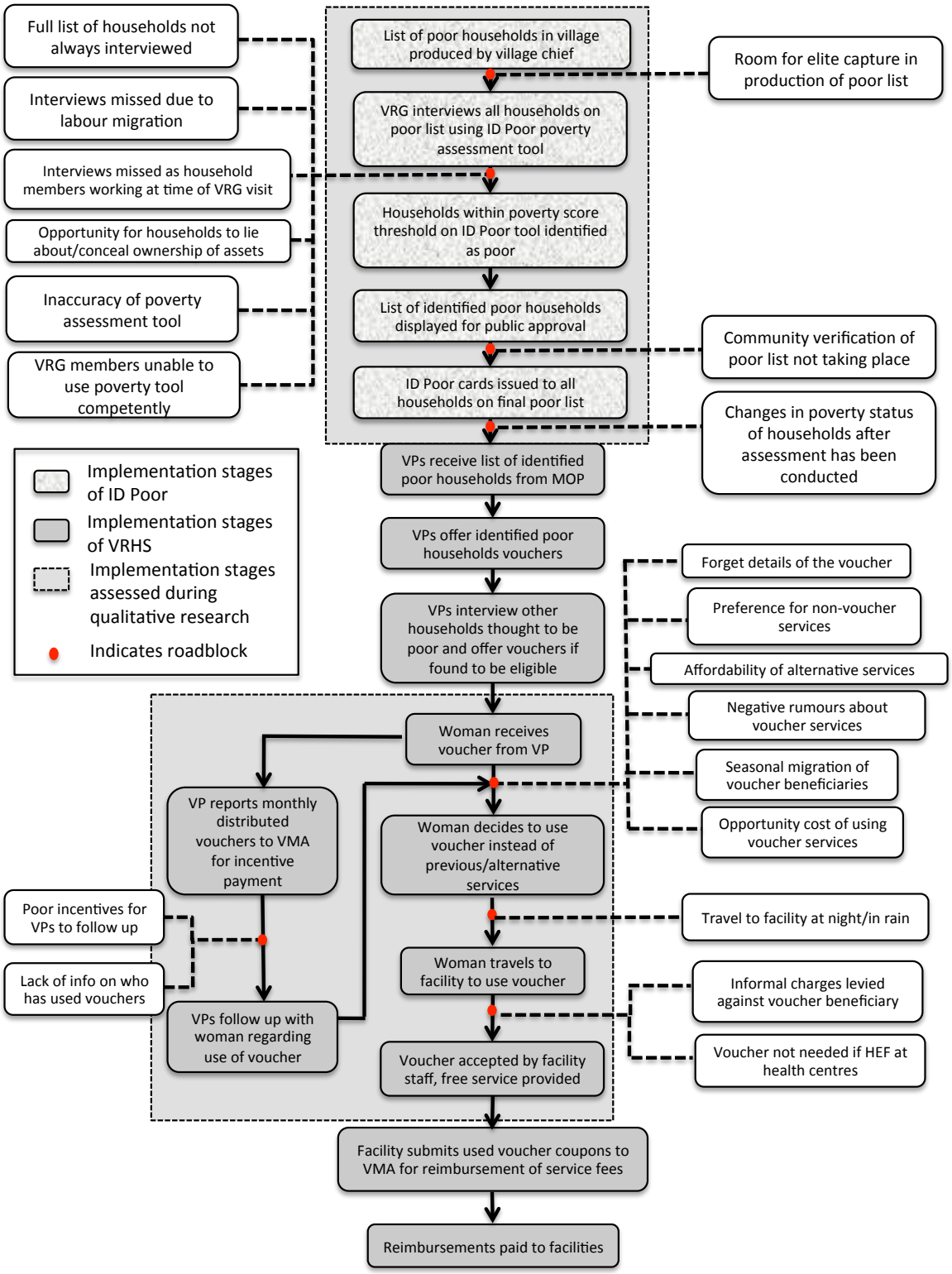


Figure 9.2: Roadblocks to implementation of ID Poor and VRHS

It is possible to consider the roadblocks depicted within figure 9.2 in reference to the determinants of reproductive and maternal health in Cambodia that are illustrated in figure 9.1. A mix of structural distal factors, social distal factors and proximate factors

are depicted within the roadblocks in figure 9.2. For example, regarding implementation of the ID Poor, six roadblocks were found to impede the progression from VRG members interviewing people on the list of poor households, to households scoring within the poverty threshold of the interview tool being identified as poor. These six roadblocks comprise structural distal factors (comprehensiveness of VRG member training, and the adequacy of the ID Poor tool), social distal factors (the full list of poor households on the initial list is not always interviewed – the incidence of which is likely to vary across villages, depending on the pressures or prejudices of the VRG team, the village chief etc), and proximate factors (labour migration of poor households, poor individuals being away working at the time of interview, and some households lying about ownership of certain assets).

What this serves to illustrate is that consideration of a wide spectrum of issues, from governance and socio-economic policy, right down to individual occupation is necessary in addressing ways to improve the implementation of initiatives aiming to reduce health inequity. It would be helpful for decision-makers and programme implementers in Cambodia working on issues of reproductive and maternal health equity to become familiar with both of the frameworks developed in this thesis as they provide important insight into the drivers of health equity, and some key reasons why both the ID Poor and VRHS programmes have not performed optimally to date. Whilst figure 9.2 below is specific to the ID Poor and VRHS, the insights related to the ID Poor are also relevant to HEFs.

9.3 Contributions of the thesis

The research detailed here addresses some important gaps in the existing evidence base on health equity in reproductive and maternal health in developing countries. These contributions are organised below according to individual research papers.

Research paper 1 makes four specific contributions to the current evidence base on reproductive and maternal health equity. Firstly, it comprises equity analysis covering the whole spectrum of reproductive and maternal health services, from family planning to post-natal care, which is uncommon within the existing literature. This differs from many studies of health equity, which commonly focus on one or two specific services (Amano et al., 2012; Arthur, 2012; Feng, Xing Lin et al., 2011; Hagos et al., 2014; Rahman, Mosiur et al., 2011). Secondly, as far as we are aware, this is the first study to assess health equity in Cambodia across multiple years of data, providing insight into trends in health equity between 2000 and 2010. Indeed, this is quite a rare approach for studies in any LMICs. Using data from a whole decade is a relatively uncommon approach within the wider health equity literature, which tends to comprise studies using data from a narrower time frame. Thirdly, the paper uses robust, rigorous methods for analysing health equity, such as concentration curves and indices, which are not commonly used in other studies in this area of health (Adamson et al., 2012; Amin et al., 2010; Feng, Xing Lin et al., 2011; Saxena et al., 2013). Finally, it uses two different measures of socio-economic status in its equity estimates (wealth and maternal education) and four different methods of health equity to thoroughly estimate reproductive and maternal health equity in Cambodia. In this respect it is somewhat unique compared to other equity studies.

Research paper 2 makes two contributions to the existing literature. Firstly, it includes qualitative analysis of people's experiences and perspectives of the ID Poor programme in Cambodia, which are rarely documented. Secondly the paper contributes to the

small but growing literature assessing different methods of poverty targeting in the context of health interventions, using a framework of targeting mechanisms and methods to structure the analysis (Hanson et al., 2008). Based on this, the paper invites a discussion regarding whether the current system in Cambodia is the most appropriate, given the situation of the poor population, and the extent to which this differs from those just above the poverty line, who are also extremely vulnerable.

Research paper 3 makes the following contributions: Firstly, it includes analysis of outcomes and experiences of the VRHS project in Cambodia, not widely documented in the international literature, and in doing so contributes to the evidence on demand side financing interventions for health in developing countries and to the debate on how to provide health access for the poor and improve health equity. Secondly, it is one of the only studies to qualitatively explore implementation of VRHS after an extended period of implementation. Thirdly, it differentiates between factors influencing the uptake of reproductive and maternal health vouchers respectively, as these varied for the different services. An earlier qualitative study, conducted shortly after the start of implementation of VRHS, failed to do this (Brody et al., 2013). Finally, it provides detailed insights into the successes and challenges of implementing a voucher project, with recommendations of improvements to the project with the potential to increase voucher redemption in the future.

Finally, research paper 4 contributes to the existing evidence base on demand side financing, and specifically to that on health equity funds, as it is the first study to assess the impact of HEFs in Cambodia on reproductive and maternal health service use and on objective health outcomes. Secondly, the paper conducts an impact evaluation using robust statistical methods, which are often not used in papers analysing Cambodia's HEFs (Annear, Peter, 2010; Bitran et al., 2003; Hardeman et al., 2004; Ir et al., 2010a; Noirhomme et al., 2007). Finally, the paper used an innovative methodology to enable

the use of difference in differences analysis with the available data, using geographic and poverty differences in exposure to HEFs as opposed to baseline and end-line intervention data.

9.4 Thesis limitations

Limitations of the individual studies conducted to address the objectives of the thesis are discussed within each of the research papers (1-4) in Chapter 5. Here the limitations of the overall thesis are discussed.

9.4.1 Defining access

There are many definitions of 'access' to services, which generally comprise multiple dimensions. Goddard and Smith (2001) suggest that access is a purely supply side concept, reflecting availability of services, quality, cost and information about facilities, whilst Jacobs et al (2012) state that access comprises four dimensions – geographic accessibility, availability, affordability and acceptability – which span supply side and demand side factors (Jacobs et al., 2012). However, accurately measuring all of these dimensions is empirically very challenging, they each comprise multiple factors and will also vary depending on from who's perspective access is being considered. Furthermore, the indicators making up these factors are rarely evidenced, rather it is service utilisation which is typically observed, "*reflecting the extent to which 'potential access' is converted into 'realised access'*" (Goddard et al., 2001) (p.1151). Therefore the rationale taken within this thesis, as per previous studies, is that service utilisation can be used as a proxy for access (Culyer, A, 1995; Goddard et al., 2001; Morris, S et al., 2009).

Compared to the complexity implicit in the alternative definitions of access above, merely assessing service utilisation reflects a simplified operationalisation of the concept. However it is also a definition that is feasible to research. Given the indicators

available within the DHS data used to address objective 1, it would not have been possible to competently measure a more complex definition of access. In researching objectives 2 and 3, using qualitative data, aspects of these more complex definitions of access were explored, however not in a comprehensive manner, as the primary focus of these studies were people's experiences of the VRHS project and HEFs. Nonetheless, the approach used in this thesis to assess access to health services follows that taken by other researchers, who have used a simplified definition of access in order to apply a feasible research methodology to a relatively intangible concept (Culyer, A, 1995; Goddard et al., 2001; Morris, S et al., 2009).

9.4.2 Defining equity

As with health access, there is much debate and a wide spectrum of perspectives on how to define health equity. This was discussed in the literature review in Chapter 2. It is argued within the literature that the distribution of health services according to *need* is typically considered to be equitable, for example compared to a distribution which maximises societal utility (the Utilitarian perspective), or which maximises the health only of the most ill (the Rawlsian perspective) (Culyer, A, 1992; Gravelle et al., 2006; Morris, S et al., 2009; Olsen, 2009; Wagstaff, A et al., 2000).

In distributing services according to need, two sub-definitions can be discerned – horizontal equity, comprising equal access or treatment for equal need; and vertical equity, defined as unequal access or treatment for unequal need (Culyer, A, 1995). In this thesis, a definition of horizontal equity has been adopted, as is more common in the existing literature for studies considering equity of health service distribution. Broadly this can be interpreted as the perception that health is distributed equitably when all those who have the same need for health services have the same access to those services. As this thesis has focused on reproductive and maternal health services, it has been assumed that all women have the same need for services – all women who do not

want to have any more children will need some form of contraception, and all women who are pregnant will need ANC, delivery care and PNC. From this perspective access to services is considered equitable if all women access the same services. This is of course, again, a simplified perspective of need for services. In reality within reproductive and maternal health, not all women do have the same universal need for services. For example, some women may have biological conditions or factors that mean that they are not eligible to use all contraceptive services. Some women are considered to be of higher risk than others during pregnancy and particularly delivery, such as if they are overweight, have high blood pressure or are carrying more than one baby. These women will in theory need access to different services compared to women with normal or low risk pregnancies. Need is also a subjective concept; whilst from a western, biomedical perspective we perceive all pregnant women to be in need of formal healthcare, some Cambodian women who are familiar mainly with traditional health providers may believe that what they need at their delivery is a traditional birth attendant, rather than a trained midwife. Given this, a more appropriate definition of equity may have been vertical equity, which would have allowed for such nuances in need for reproductive and maternal health services. However, both the quantitative and qualitative data used within the thesis were not able to capture such variations in need, making assessment of vertical equity implausible.

Also related to defining health equity, it is important to consider not only how we define what distribution is fair, but also against which socioeconomic parameters we consider societal distribution. It is possible to explore the distribution of society against any number of variables. Most commonly when considering health equity the interest is in the distribution of health against wealth. However it can also be enlightening to explore the distribution of health against, for example, geographic region (urban/rural), education, province or state, or ethnic group, depending on the context of the study. In addressing objective 1 of the thesis, equity was considered

against multiple socioeconomic variables – education, rural/urban location and wealth. However in the rest of the thesis, equity was only explored in terms of distribution of health against wealth. This limited the extent to which equity could be explored within objectives 2-4, and researching health equity against additional parameters such as education and province could have provided additional insights into health equity in Cambodia. However, as objectives 2-4 were concerned with interventions already operating in Cambodia, it made sense to follow the socioeconomic variables by which these programmes themselves considered health equity, which were on the basis of wealth. Furthermore to explore health equity on the basis of province or education in relation to the ID Poor, VRHS and the HEFs would have required significantly more data and time, which the limits of this thesis did not permit.

9.4.3 Researching abortion services

The aim of this thesis was to consider health equity across the whole spectrum of reproductive and maternal health services – family planning, ANC, delivery care, PNC and safe abortion – largely as many other studies of health equity only consider access to one or a few of these services (Amano et al., 2012; Arthur, 2012; Feng, Xing Lin et al., 2011; Hagos et al., 2014; Rahman, Mosiur et al., 2011). This full spectrum of services was researched under objective 1 of the thesis. However, as discussed in Research Paper 1, Chapter 5, there are likely to be many errors within the DHS data regarding use of abortion services, and therefore the results relating to use of these services are to be interpreted with some caution. Researching abortion is challenging in nearly all settings given the sensitive and political nature of the topic, even in countries where abortion is legal, such as in Cambodia. This can make data reliability somewhat uncertain.

In addressing objectives 2-4, abortion was not considered within the spectrum of reproductive and maternal health services being researched. Within VRHS a voucher is

available for free abortion and post-abortion care services. However unlike the vouchers for family planning and safe motherhood services, abortion vouchers are not distributed to households, as this could be misconstrued as the project promoting the use of abortions, a service that is still politically sensitive. Therefore vouchers are made available at the clinic of the contracted provider, where free abortion services can be accessed, and poor women going to the clinics seeking abortion services are made aware of the vouchers at that point. As such, the issues considered within objective 3 regarding access to and use of the vouchers for poor women were not applicable in the same way for the abortion vouchers, and so these were not explored within this study. The use of HEFs for reproductive and maternal health services, explored in objective 4, relied on DHS data. Given the limitations in this dataset regarding use of abortion services highlighted in Research Paper 1, use of abortion services through HEFs was not included as an outcome in this study.

For comprehensiveness it would have been desirable to research abortion services throughout all objectives within the thesis. However, limitations and difficulties with generating data on this service are such that this was just not possible. All other services within the spectrum of reproductive and maternal health services were explored as fully as possible.

9.4.4 Scope of the thesis

Given the time and resource constraints in conducting fieldwork to collect primary qualitative data for the thesis, it was necessary to restrict the focus of qualitative interviews to discussion of specific interventions. These were the ID Poor and the VRHS vouchers. It was not possible to also discuss HEFs at length in qualitative interviews. Therefore the same qualitative analysis exploring roadblocks could not be applied to HEF implementation, as was conducted in reference to the ID Poor and vouchers. As such the process diagram of implementation of HEFs was not adapted to

illustrate roadblocks to implementation. For comprehensiveness of the thesis it would be been preferable to have analysed all three interventions in the same way. However, substantial data, time and cost was involved in producing the qualitative analysis addressing the ID Poor and VRHS alone. To have included a third intervention in this process was beyond the scope of this thesis.

In addition, the thesis does not incorporate an impact evaluation of VRHS, which would have been preferential, for comprehensiveness. In order to conduct such an evaluation of VRHS, outcome data from comparable control provinces would be necessary. This data was not readily available, and the time and cost implications of collecting this data specifically for the thesis were not feasible given the limited budget and time available with which to complete the PhD.

9.4.5 Generalisability of findings

The findings from research papers 2 and 3 are drawn from data collected in a single province, Kampong Thom. It is possible that some aspects of the operation of both the ID Poor and VRHS in Kampong Thom influenced the results found, and may not be applicable to other contexts. However, the ID Poor is conducted across all provinces in Cambodia using a standard approach and therefore the findings from research paper 2 can be argued to hold external validity for settings across Cambodia. Equally, VRHS was implemented in two additional provinces, which although may have some contextual differences to Kampong Thom, as the implementation of the project is the same for all provinces the findings from research paper 3 are also applicable to the operation of VRHS in Prey Veng and Kampot provinces. Furthermore, since the data were gathered for this research, VRHS has entered the second phase of its operation and has expanded to a further six provinces. Again, whilst there may be some contextual differences between Kampong Thom and the new provinces in which it is operating, the findings from research paper 3 will still be highly relevant to the latter.

Whilst the findings of the thesis are specific to Cambodia, aspects of them are also generalisable and of relevance to other country settings. The methods used in conducting the equity analysis in Research Paper 1, particularly the focus on six services across three rounds of data, are certainly generalisable to other countries with DHS data. The findings from Research Paper 2 on the ID Poor are to some degree generalisable to other settings that are using or intending to use poverty targeting mechanisms comprising a mix of proxy means testing and community based targeting methods. However elements of exactly how these methods are applied and received in the Cambodian context will vary in different settings. As voucher programmes tend to have common elements – such as, if they are targeted, some way of identifying beneficiaries and distributing vouchers; a voucher management agency to operate as the third party purchaser of services; contracted service providers; systems to prevent and check for fraud and abuse within the intervention – the findings from Research Paper 3 will be generalisable to some degree to other countries in which vouchers are operating, or where they are planned. However, this research illustrates that there are various factors beyond merely the voucher project that have influenced the experience and implementation of VRHS in Cambodia, these are quite country-specific and therefore some caution should be applied in relating these findings to settings where the context is vastly different to that of Cambodia.

The basic premise of the health equity fund is to subsidise healthcare for the poor. In this respect there are many such schemes in other developing countries that could draw on and benefit from the findings discussed in Research Paper 4 regarding the HEFs. Although, caution should be taken regarding the aspects of the intervention which are specific to Cambodia, such as the ID Poor programme used for identifying intended beneficiaries, in generalising the findings to other contexts. The findings are also consistent with those from rigorous studies in other countries.

9.5 Policy implications

The following section draws together the policy implications stemming from the research conducted in this thesis. Specifically it discusses the implications related to achieving continued health equity improvements in Cambodia, and to overcoming the roadblocks to implementing the ID Poor, and two demand-side financing interventions reviewed in the thesis – VRHS and HEFs.

9.5.1 Achieving continued improvements in health equity

The research conducted for this thesis has illustrated that whilst equity in use of reproductive and maternal health services in Cambodia has improved since 2000, for some services quite dramatically, inequity in use of some services remains, with wealthier, more educated women accessing services disproportionately more than poorer, less educated women. This is particularly the case for facility-based deliveries and skilled birth attendance at delivery, and to a lesser extent for antenatal care and postnatal care (Dingle et al., 2013). Therefore it is important that health and social policy in Cambodia continues to focus on those disadvantaged groups in order to maintain the positive trends in equity improvement by which the country is currently benefitting. The equity analysis conducted here demonstrates well the importance of not merely assessing service coverage but also the distribution of those services, to gain a more detailed understanding of service use within a particular context, in order to tailor policy responses accordingly. Overall, the evidence from this thesis has illustrated that demand side initiatives alone are not sufficient in ensuring health equity, but rather that they are part of a complex network of interdependent factors that between them are resulting in a gradual shift towards increased use of reproductive and maternal health services amongst more disadvantaged groups.

The conceptual framework of the determinants of reproductive and maternal health and health equity displayed in Figure 9.1 illustrates that a plethora of factors, structural, policy, social, distal and proximate, impact on health equity in Cambodia. In line with key messages from the social determinants of health literature, it is important that these are all considered in the development of future strategies to tackle health equity, particularly in reproductive and maternal health, as the more of these determinants that can be addressed, the more successful policies will be in combating the true drivers of health inequity (Commission on the Social Determinants of Health, 2008; Malarcher et al., 2010; Marmot, 2005). For example, the framework suggests that strengthening the health system is important in improving health equity, such as increasing capacity, equipment and staff training at primary level facilities. However improving the health system alone will not achieve health equity. Increasing education, for example, particularly for girls, could be considered equally important in contributing to changes in social attitudes and norms regarding reproductive and maternal health services, as well as to occupational prospects and long-term household income. Improving roads and infrastructure is also central to ensuring health equity, to enable individuals to access facilities more easily and quickly, when they most need them, such as when they are in labour. All aspects of the framework depicted in Figure 9.1 can be understood to impact on health equity in reproductive and maternal health, and therefore they will all need to be addressed in some way in order to achieve health equity in Cambodia. Improvements to the policy interventions included in the framework are discussed in detail below.

9.5.2 Overcoming roadblocks of demand-side financing interventions

Much of this thesis has focused on assessing and understanding the operation and impact of two prominent demand-side financing interventions in Cambodia – VRHS and HEFs (chapters 7 and 8) – in addition to the ID Poor (chapter 6), which plays a pivotal role in targeting the benefits of both of these schemes. Many implications have come

out of the research, specifically regarding how to overcome some of the roadblocks that are currently impacting on the implementation of these three interventions (see figure 9.2). Each of these is discussed below in turn.

The ID Poor

Chapter 6 identified several 'quick wins' which could immediately improve the accuracy of the ID Poor, including providing advance notice of when identification interviews are to take place, to ensure that residents are available for them; revising the identification tool to more closely reflect living standards of the poor today; ensuring that members of the VRG conducting the means-testing have sufficient training in implementing the tool; developing a system for addressing residents' complaints with the system; and strengthening monitoring of the community verification stages of the programme. Qualitative research reported in chapter 6 also suggests that the ID Poor has the potential to benefit from some more significant structural developments, such as shifting to a rolling process of identification, whereby households believed to have undergone a change in poverty status can be interviewed at any time. The latter would serve to overcome some of the challenges related to the dynamic nature of poverty in Cambodia, whereby even minor shocks can tip a household from just above the poverty threshold, to below it very easily. This aspect of poverty in Cambodia is currently not well met by the ID Poor system as it stands, which only screens households every three to four years. This issue is particularly pertinent as the size of the population existing within the 'near poor' bracket, hovering just above the poverty line but remaining extremely vulnerable to dropping back into poverty, is rapidly increasing (World Bank, 2013a).

Given the limitations and identification errors within the ID Poor established through the research, there is a clear implication that it is time for a more public discussion in Cambodia regarding the accuracy of the ID Poor, and whether individual household

assessment is the appropriate tool for identifying the poor, per se. There would be significant benefit from an assessment of whether alternative mechanisms to household screening of poverty status could achieve the same or better results. The current approach of individual household screening is cost and time intensive, and results in substantial identification errors. Alternative methods of poverty identification, such as geographic targeting, could produce equivalent or improved accuracy of targeting, at potentially lower cost. Such methods could be very well suited to Cambodia, where there is only a fine line between the poor and the near poor, to the extent that both of those groups would benefit from free access to healthcare. With geographic targeting there is, however, the risk that poor households in more well off areas will then be marginalised. It would be important to explore what proportion of the overall population this group represented. It is possible that individual targeting methods could be applied additionally in such areas to ensure that poor households there are also identified.

VRHS

Researching the VRHS project (chapter 7) has identified several factors with the potential to improve the effectiveness of reproductive and maternal health vouchers in Cambodia. Specifically these include a need to ensure that voucher users continue to receive encouragement to use *all* services available with their voucher, that is, all four antenatal visits, and the two postnatal visits. In addition the findings suggest focus should be placed on developing solutions to overcome problems related to the following issues: firstly, accessing health centre services at night and in heavy rain for women in labour, as this has been found to be one of the major barriers to use of safe motherhood vouchers. This could be achieved by implementing village-level emergency transport services for example, having an on call taxi rota that operates during night-time hours, particularly during the rainy season, and distributing their numbers to women due to deliver. In Tanzania the Connect Community Health Agents

project has provided ambulance vehicles and ambulance boats in Rufiji district, to overcome the barriers of accessing facilities for women in labour (Exavery et al., 2014). Improving road quality by tarmacking village roads is a more long-term additional measure that should be also considered.

Secondly, supporting training of health centre staff to provide long-term contraception (implants and IUDs), will improve the accessibility of these products for women and remove an important roadblock to voucher uptake. For public sector facilities, this will need to be funded and conducted by the Ministry of Health, which could be challenging to secure and co-ordinate as there are already so many demands on their scarce resources. VRHS has recently had approval to allocate a small proportion of its funds to training of facility staff in such methods, however this represents more of a plaster than a long term solution to the problem, as it will not cover facilities in skills training on an on-going basis. In developing countries, social franchising has become a popular approach for training and capacity building of private sector facilities to provide reproductive health services, for example the Suraj social franchise in Pakistan, the Sun social franchise in Myanmar, and the Sun social franchise in Cambodia, which currently operates in 20% of provinces. However the evidence base on social franchising is limited (Azmat et al., 2013; Jacobs et al., 2012; Montagu et al., 2013; PSI, 2014).

Thirdly, helping to change community attitudes towards the use of long-term contraception, as this has been identified as an important influence on service use. In many developing countries social marketing and behaviour change communication are used to raise awareness and change attitudes regarding specific health and social issues, or brands of health products including contraception. In Cambodia, Population Services International has been working on social marketing, franchising and behaviour change communication for more than a decade, including campaigns focusing on reproductive health issues (PSI, 2014). Focus and support should be given

to directing such campaigns towards the issue of long-term contraception, and ensuring that it is communicated via a medium that will reach all rural families.

Finally, qualitative research identified that one key factor inhibiting voucher uptake was that it was convenient for participants to continue to use private providers to access reproductive health services, with whom they already have a relationship. One possibility to improve voucher uptake is to contract private providers within VRHS, to improve the accessibility of voucher services, and to make services available at providers already currently used by target beneficiaries. With this come important questions regarding how to ensure the quality of private providers. VRHS already has a quality assessment in place, which is applied to facilities before they are contracted as part of the project. This would need to be applied to prospective private providers as well. However, consideration should also be made regarding whether support would be provided to bring potential private providers up to the necessary standard, by providing them with training and equipment, in the manner of a social franchising intervention.

HEFs

This thesis (chapter 8), supported by evidence from other studies, suggests there are implementation problems with HEFs in Cambodia, both in targeting and in the provision of benefits to HEF members. The evidence in chapter 8 found no impact of HEFs on health service utilisation or health outcomes. This is the case despite HEFs having been in operation for more than a decade. There are several reasons why this might be the case. The Ministry of Health should consider this evidence, as it raises concerns that the HEFs are not delivering the impacts the Government would have hoped for. There are several recommendations to come out of the thesis for ways to improve the design of the HEFs and produce greater impact. Firstly, improved targeting and minimising of inclusion and exclusion errors should remain an on-going

priority for Government, HEFOs and monitors of the HEFs. This recommendation overlaps with the issues raised above about improving the ID Poor, as pre-identification within the HEF is based solely on the outcome of the ID Poor. If the quick wins outlined above were implemented, it is likely that a reduction in leakage and under-coverage of HEF benefits would result, improving the overall impact of the intervention. Furthermore, considerations regarding alternative mechanisms for targeting the poor such as geographic targeting are also applicable to targeting of HEFs.

Secondly, expanded coverage of the HEFs to village level services has the potential to remove some of the distance, transport and opportunity costs which have an important impact on service use in Cambodia, and could result in improved service use, with knock-on health effects. Plans for such expansion are currently on-going.

Thirdly, one possible reason for a lack of effect of HEFs on service use is that HEF households are reluctant to use their cards to receive free services due to fear of discrimination on being identified as poor. Therefore training and monitoring of HEF facilities by the Ministry of Health/HEFI should be increased to ensure that HEF providers are not discriminating against poor clients and providing them with poorer quality services or other forms of poor treatment, which might dissuade use of their HEF cards. Similarly, monitoring should be improved to ensure that providers are not charging HEF clients with informal payments for services, which can serve to undermine the HEFs and reduce the likelihood the beneficiaries will use their cards to access services.

Fourthly, it was identified in chapter 7 that women typically prefer to use private providers rather than public for accessing reproductive health services. As the HEFs also provide access to public services, this may explain in part the lack of effect found of HEFs on reproductive health service use. General improvement in the overall quality of

public health services in Cambodia would be likely to encourage HEF beneficiaries to use public facilities with their HEF cards, instead of opting for private providers. Several complaints were made during the course of primary data collection for the PhD of the poor quality of services particularly at the provincial hospital in Kampong Thom, which dissuaded HEF beneficiaries from accessing services there with their cards. If the reputation of Cambodia's public health services was improved as a result of delivering better quality services, HEFs may have greater impact on service utilisation and health outcomes. Improvements in quality would be made by ensuring, for example, better opening hours of facilities, more and well trained staff, and the availability of equipment and supplies for the services offered at facilities.

9.5.3 Overlap between VRHS and HEFs

It is very clear that an overlap exists between the services offered by vouchers and HEFs, where HEFs are operating at the village level. With HEFs continuing to expand down to the village level, this issue is only going to become more pertinent. There is little logic in having two programmes in the same area providing free access to the same package of services. If nothing else it represents an enormous duplication of time, effort and resources, all of which are scarce in this context and therefore require more careful consideration in terms of their distribution. Ultimately this comes down to an issue greater than either of the two interventions alone – improved harmonisation and alignment of donor and government funding. This is an area in which Cambodia is notoriously weak and will require strong governance to resolve.

9.5.4 Targeting versus universal fee removal

Moving beyond the issues of improving the performance of the ID Poor, as discussed above, a wider issue is whether targeting of benefits per se is worthwhile, or whether making (a package of) services free to all and removing the cost and effort of targeting

altogether might be a more effective approach. The subsequent challenge posed by this would be how to replace the revenue lost from user fees. It is possible to envisage a system where all households are enabled free access to a comprehensive package of public services, which wealthier/non-poor households would be likely to opt out of using, in favour of paying out of pocket for private providers, or by social health insurance schemes in which they are already covered, such as the National Social Security Fund for Civil Servants. This would result in free services largely being used by poor and near-poor households. If social health insurance schemes were scaled up to cover a greater proportion of formal sector employees, revenue derived from insurance premiums, or other tax-based contributions from this sector could be used to subsidise free care in public services. In Thailand, the 30 Bhat programme enabled universal coverage of healthcare to the population by cutting health service fees to a nominal copayment of 30 Thai Bhat (US$0.75), plus restructuring the public health sector budget to provide hospitals with an annual capitation-based payment of 1,200 Bhat (US$35) for each person in the province. The 30 Bhat programme has been perceived as a great success for Thailand in enabling their population to access healthcare at little to no cost (Gruber et al., 2014). Cambodia should look to such examples, which do not target poor households for specific benefits, but which have achieved universal access to healthcare at minimal cost for all users.

9.6 Areas for further research

This thesis makes key contributions to the existing knowledge base on demand-side financing in health with evidence from vouchers and HEFs in Cambodia. It is critical that research continues to investigate the impact of HEFs and vouchers, including those in Cambodia, to gain a better understanding of this growing area of public health. Conducting some action research may be a useful next step to improve the schemes and overcome the pitfalls and challenges identified here, whilst also researching the process and documenting guidelines for best practice. One aspect of these

interventions that was not within the scope of this thesis to research was their cost-effectiveness. Cost-effectiveness analysis of Cambodia's vouchers, HEFs and the ID Poor programme should be prioritised in future research in order to provide crucial additional perspective of these interventions. Although, this is potentially very challenging given the data that would be required e.g. estimates of the effectiveness of each of the interventions. Furthermore, given the recommendations that have been made above regarding these schemes, it would be beneficial to focus on the implementation issues first, before subsequently considering programme impact. As such,

An important next step specifically for HEFs is to explore why they are not currently having an impact on service utilisation and health outcomes. Similar qualitative research to that conducted in this thesis on the ID Poor and VRHS would help to provide such insights and could produce a useful understanding of where roadblocks exist in the implementation of the HEFs, and how to overcome these. Data could be collected through semi-structured interviews or focus groups with eligible (poor) households in HEF and non-HEF areas, sampling for a cross-section of severity of illnesses experienced in recent years, as well as with HEF service providers at hospital and primary levels, and with HEF implementation staff at district, provincial and national levels.

To inform the discussion of alternative approaches to poverty targeting in Cambodia, and whether to target resources at all, further exploration of different targeting methods and their applicability to the Cambodian context would be of significant use. For example conducting field experiments of respective methods, with controls, to estimate the relative accuracy of each method, and the process of their implementation. In addition cost-effectiveness analysis of the ID Poor and potential alternative strategies, using for example, households accurately identified as poor as the measure

of effectiveness, would provide key evidence to inform this debate, particularly if they can include the estimated costs of the projected impact of differing models for health service use. This would require independent poverty assessments to be conducted of sample households, against which to compare the outcomes of the mechanisms being studied. The costs to be taken into account in such analysis include salaries of all staff involved in the ID Poor and projected costs for comparative mechanisms, related office costs for housing staff, costs of remunerating any community members, costs of materials required for conducting poverty assessments, and for producing poverty identity cards.

9.7 Conclusion

Disparities in the reproductive and maternal health experienced by the poorest compared to the richest women, the illiterate versus the educated, city dwellers over rural farming families, are stark in LMICs, and unfair. Some consider such gaps to be the greatest public health threat of the 21st century (Edwards et al., 2011). This thesis confirms that Cambodia is among the ranks of developing countries whose poor, uneducated, rural women suffer disproportionately worse reproductive and maternal health than their more fortunate counterparts. However, the evidence generated here also signals hope for Cambodia, as analysis indicates that over time the balance of these health inequities is gradually levelling.

DSF interventions are receiving increasing attention in the public health arena as tools with the potential to effect behaviour change, improve health, and slow the progression of, or reduce, poverty for the world's most vulnerable populations. The Government of Cambodia has made bold health financing reforms, most notably with the introduction and expansions of HEFs, and more recently with the VHRS. However the evidence presented here indicates that targeting of the poor (using the ID Poor system) and implementation of the schemes has been far from perfect. Furthermore, it suggests

that HEFs provide financial protection, but have little impact on utilisation and health (as measured by childhood malnutrition, and anaemia in women and children). Myriad roadblocks are evident which are hindering the potential benefits of these schemes.

DSF is a mechanism to overcome the challenges that price imposes on poor households and their subsequent access to health services. What has been illustrated here in the case of Cambodia is that several other highly influential factors remain at play for vulnerable individuals, besides price, which vouchers and HEFs in their current form are less well designed to tackle. One such factor is the effectiveness of the ID poor in indentifying poor households. The time is now prudent to initiate discussion regarding this issue, and the possibility of exploring alternative targeting strategies, and the potential benefits they offer.

Cambodia's dramatic health improvements in the few decades since war, dictatorship and genocide threatened to decimate the country, serve as an impressive example from which many lessons can be learned. In the context of these achievements, a reflective approach, retaining focus on improving the health of all citizens, could ensure a healthier, more prosperous future for every Khmer household.

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APPENDICES

Appendix 1 Summary table of literature review on inequity in use of reproductive and maternal health services in developing countries

Country, Author, Year	Equity methodology	Social stratification variables	Services	Results
Bangladesh, Amin et al, 2010	Logistic regression	Wealth, maternal education, paternal education	ANC by skilled provider	Wealth: OR of richest compared to poorest quintile = 7.61** (2.21-26.16)
				Maternal ed: OR of 5+ years ed compared to 1-5 years = 2.65** (1.39-5.06)
				Paternal ed: OR of 5+ years ed compared to 1-5 years = 1.22 (0.48-3.09)
			SBA	Wealth: OR of richest compared to poorest quintile = 10.99** (2.67-45.19)
				Maternal ed: OR of 5+ years ed compared to 1-5 years = 2.49** (1.23-5.05)
				Paternal ed: OR of 5+ years ed compared to 1-5 years = 0.45 (0.20-1.02)
			PNC by skilled provider	Wealth: OR of richest compared to poorest = 34.93** (6.30-193.64)
				Maternal ed: OR of 5+ years ed compared to 1-5 years = 2.14 (0.93-4.93)
				Paternal ed: OR of 5+ years ed compared to 1-5 years =0.34 (0.11-1.04)
Bangladesh, Chowdury et al, 2006	Logistic regression	Wealth, maternal education, paternal education	SBA during home delivery	Wealth: AOR for richest compared to poorest women = 1.94 (1.69-2.24);
				Maternal ed: AOR for 10+ years ed compared to uneducated women = 2.02 (1.69-2.42)
				Paternal ed: AOR for 10+ years ed compared to uneducated husbands = 1.46 (1.27-1.67)
			SBA at FBD	Wealth: AOR for richest compared to poorest women = 2.05 (1.72-2.43)
				Maternal ed: AOR for 10+ years ed compared to uneducated women = 2.69 (2.26-3.20)

				Paternal ed: AOR for 10+ years ed compared to uneducated husbands = 1.32 (1.13-1.55)
Bangladesh, Collin et al, 2007	Logistic regression	Wealth, maternal education, rural-urban location	1+ ANC	Wealth: AOR for highest compared to lowest quintile = 2.59 (2.24, 2.99)
				Ed: AOR for secondary+ education compared to uneducated = 9.97 (6.86, 14.47)
				Rural/Urban: AOR for urban compared to rural women = 1.97 (1.72, 2.18)
			SBA	Wealth: AOR for highest compared to lowest quintile = 3.06 (2.40, 3.90)
				Ed: AOR for secondary+ education compared to uneducated =5.31 (4.05, 6.95)
				Rural/Urban: AOR urban compared to rural women = 2.70 (2.39, 3.06)
			Delivery by caesarean section	Wealth: AOR for highest compared to lowest quintile = 6.74 (2.69, 16.84)
				Ed: AOR secondary+ education compared to uneducated = 4.00 (2.16, 7.40)
				Rural/Urban: AOR for urban compared to rural women = 2.02 (1.53, 2.67)
Bangladesh, Karim et al, 2006	Descriptive	Poverty status	% FBD	Extreme poor = 9.3%; Moderate poor = 8.6%; non-poor = 26.1%
			% use of family planning	Extreme poor = 58.6%; Moderate poor = 57.1%; non-poor = 55.6%
Bangladesh, Rahman et al, 2008	Logistic regression	Wealth	ANC	AOR for women with greater compared to lower household resources = 1.58**
			SBA	AOR for women with greater compared to lower household resources = 6.31**
Bangladesh, Zere et al, 2013	Slope index of inequality, relative index of inequality	Wealth	4+ ANC	SII = 52.5 (31.1-73.7); RII = 2.5 (1.5-3.6)
			SBA	SII = 40.9 (17.0-64.9); RII = 3.7 (1.5-5.9)
			TBA	SII = -44.8 (-70.5 - -19.1); RII = -0.71 (-1.1 - -0.3)
			FBD	SII = 48.9 (23.7-74.1); RII = 74.1 (3.3-1.6)
			Home delivery	SII = -49.4 (-74.3 - -24.4); RII = -0.58 (-0.87 - -0.29)
			Caesarean section	SII = 30.4 (11.0-49.8); RII = 4.0 (1.5-6.6)
			Use of modern contraception	SII = 5.0 (-2.0-11.9); RII = 0.11 (-0.04-0.27)

China, Feng et al, 2011	Rate ratios	Wealth, rural-urban location	FBD	Wealth: ARR of highest compared to lowest quintile women = 1.12 (1.03-1.23)
				Rural/urban: ARR of urban women compared to the most rural women = 2.57 (2.00-3.29)
			Trends in FBD	Wealth: ARR of highest compared to lowest quintile women: 1988-2001 = 1.13 (1.09-1.17), 2002-2008 = 1.03 (1.01-1.05)
				Rural/urban: ARR of urban compared to most rural women: 1988-2001 = 1.17 (1.05-1.30), 2002-2008 = 1.07 (0.99-1.16)
Columbia, Gonzalez et al, 2010	Relative index of inequality	Wealth	Current non-use of contraception among sexually active women	RII urban areas = 2.84 (2.41-3.35); rural areas = 4.6 (3.06-6.79). Statistically significant difference between inequality in rural and urban areas **
			Never use of contraception among sexually active women	RII urban areas = 7.14 (5.94-8.59); rural areas =23.5 (14.6-38.1). Statistically significant difference bewteen inequality in rural and urban areas **
Ethiopia, Amano et al, 2012	Logistic regression	Maternal education, paternal education, rural-urban location	FBD	Maternal ed: AOR for secondary+ ed compared to illiterate women = 4.31 (1.62-11.46)
				Paternal ed: AOR for secondary+ ed compared to illiterate husbands = 2.77 (1.07-7.19)
				Rural/Urban: AOR for urban compared to rural women = 2.27 (1.17-4.40)
Ethiopia, Hagos et al, 2014	Logistic regression	Wealth, maternal education	FBD	Wealth: AOR for richest compared to poorest women = 16.82* (7.96-35.54)
				Maternal ed: AOR for university+ ed compared to no education = 3.53* (1.22-10.20)
Ethiopia, Mengesha et al, 2013	Logistic regression	Maternal education, rural-urban location	SBA	Maternal ed: AOR for secondary+ ed compared to illiterate women = 2.18 (1.29-3.68)
				Rural/urban: AOR for urban compared to rural women = 8.8 (5.32-14.46)
Ghana, Arthur, 2012	Logistic regression	Wealth, maternal education,	ANC	Wealth: AOR for richest compared to poorest women = 6.79***

		rural-urban location		Maternal ed: AOR for secondary+ ed compared to uneducated women = 1.69*
				Rural/Urban: AOR for urban compared to rural women = 2.05*
Ghana, Zere et al, 2012	Slope index of inequality, relative index of inequality	Wealth	SBA	SII = 87.5* (75.6-99.5); RII = 1.5 (1.29-1.70)
			FBD	SII = 86.1* (74.2-97.9); RII = 1.5 (1.30-1.71)
			Delivery in public facility	SII = 65.4* (47.4-83.3); RII = 1.4 (0.98-1.72)
			Delivery in private facility	SII = 20.6* (7.3-33.8); RII = 2.4 (0.84-3.89)
			Home delivery	SII = -85.5* (-97.8 - -73.2); RII = -2.0 (-2.33 - -1.47)
			Caesarean section	SII = 15.2* (8.7-21.8); RII = 2.20 (1.26-3.16)
			Use of modern contracep tion	SII = 11.9* (11.3-16.5); RII = 0.72 (0.68-0.99)
India, Karnataka, Adamson et al 2012	Logistic regression	Caste, poverty status	FBD	Caste: AOR of scheduled caste/tribe compared to general/other castes = 0.54* (0.34-0.83)
				Poverty: AOR of having poverty card compared to no card = 0.67* (0.52-0.87)
India, Uttar Pradesh, Bacqui et al, 2008	Concentration index	Wealth	1+ ANC	CI = 0.3737 (0.3508, 0.3966)
			SBA	CI = 0.4506 (0.4230, 0.4782)
India, urban, Goli et al, 2013	Concentration index	Wealth	Less than 3 ANC	CI = -0.35
			Non-institutional delivery	CI = -0.32
India, Mohanty et al, 2006	Concentration index	Wealth	3+ ANC	1992: CI = 0.24; 2006: CI = 0.23
			SBA	1992: CI = 0.32; 2006: CI = 0.27
			Use of contracep tion	1992: CI = 0.15; 2006 CI: = 0.09
			Unmet need for contracep tion	1992: CI = -0.08; 2006: CI = -0.151
India, Pakillada vath et al, 2004	Logisitic regression	Maternal education, paternal education, religion	ANC	Maternal ed: OR for secondary+ ed = Bihar 2.8**, Madhya Pradesh 5.1**,Rajasthan 13.0**, Uttar Pradesh 4.3**
				Paternal ed: OR for secondary+ ed + Bihar 2.2**, Madhya Pradesh 1.5*, Rajasthan 1.5*, Uttar Pradesh

				1.6*
				Religion: OR for Muslim compared to Hindu = Madhya Pradesh 4.9**; OR for non-Hindu and non-Muslim compared to Hindu = Uttar Pradesh 3.5**; Bihar and Rajasthan no effect.
India, Saxena et al, 2013	Logisitic regression	Wealth, education, caste, rural-urban location	Less than 3 ANC	Wealth: OR of poor compared to non-poor = 1.87*** (1.64-2.13)
				Ed: OR of illiterate compared to 5+ years education = 2.5*** (2.23-2.81)
				Caste: OR of scheduled caste compared to other castes = 1.75*** (1.46-2.11)
				Rural/urban: OR of rural compared to urban = 2.0*** (1.75-2.3)
			Non facility-based delivery	Wealth: OR of poor compared to non-poor = 1.72*** (1.51-1.95)
				Ed: OR of illiterate compared to 5+ years education = 2.29*** (2.03-2.57)
				Caste: OR of scheduled caste compared to other castes = 1.25** (1.03-1.51)
				Rural/urban: OR of rural compared to urban = 3.04*** (2.62-3.52)
			Non use of modern contraceptives	Wealth: OR of poor compared to non-poor = 1.31*** (1.15-1.50)
				Ed: OR of illiterate compared to 5+ years education = 1.41*** (1.25-1.59)
				Caste: OR of scheduled caste compared to other castes = 1.04 (0.87-1.23)
				Rural/urban: OR of rural compared to urban = 1.1 (0.97-1.24)
India, rural, Singh et al, 2012	Logisitic regression	Wealth, maternal education, paternal education, caste	Comprehensive ANC	Wealth: OR of richest compared to poorest = 2.58*** (1.63-4.09)
				Maternal ed: OR for high school+ compared to illiterate women = 2.85*** (2.03-3.99)
				Paternal ed OR for high school+ compared to illiterate husbands = 1.35** (1.02-1.81)
				Caste: OR of scheduled castes compared to other castes = 0.83 (0.64-1.08)
			SBA	Wealth: OR of richest compared to poorest = 3.61*** (1.09-5.18)

				Maternal ed: OR for high school+ compared to illiterate women = 3.88*** (2.72-5.53)
				Paternal ed OR for high school+ compared to illiterate husbands = 1.21* (0.97-1.51)
				Caste: OR of scheduled castes compared to other castes = 0.61*** (0.49-0.77)
India, Zavier and Padmadas, 2012	Logistic regression	Wealth, rural-urban location, education, caste	Permanent post-abortion contraceptive use	Wealth: OR of poorest compared to richest = 0.47* (0.23-0.98)
				Rural/urban: OR of megacity compared to rural = 2.48*** (1.49-4.11)
				Ed: OR of high school+ compared to no education = 0.77 (0.46-1.28)
				Caste: OR of scheduled compared to general caste = 1.07 (0.71-1.61)
			Modern temporary post-abortion contraceptive use	Wealth: OR of poorest compared to richest = 0.46** (0.29-0.73)
				Rural/urban: OR of megacity compared to rural = 2.35*** (1.69-3.27)
				Ed: OR of high school+ compared to no education = 2.93*** (2.18-3.94)
				Caste: OR of scheduled compared to general caste = 1.00 (0.79-1.27)
Kenya, urban, Fotso et al, 2013	Logistic regression	Wealth, maternal education	Modern contraceptive use	Wealth: AOR of richest compared to poorest = 0.41***; AOR wealth x year (2008/09) = -0.53*
				Maternal ed: AOR for secondary+ ed compared to primary ed = 0.53***; AOR ed x year (2008/09) = -0.34*
Kenya, Ochako et al, 2011	Logisitic regression	Wealth, maternal education, rural-urban location	ANC in 1st trimester	Wealth: AOR for richest compared to poorest women = 1.23
				Maternal ed: AOR for secondary+ ed compared to primary ed = 1.95***
				Rural/urban: AOR for rural compared to urban women: 0.75
			No ANC	Wealth: AOR for richest compared to poorest women = 1.23
				Maternal ed: AOR for uneducated compared to primary ed = 0.24***

				Rural/urban: AOR for rural compared to urban women: 0.75
			SBA	Wealth: AOR for richest compared to poorest women = 3.03
				Maternal ed: AOR for secondary+ ed compared to primary ed = 1.78***
				Rural/urban: AOR for rural compared to urban women: 0.56***
			No assistance at delivery	Wealth: AOR for richest compared to poorest women = 3.03***
				Maternal ed: AOR for secondary+ ed compared to primary ed = 1.78***
				Rural/urban: AOR for rural compared to urban women: 0.79***
Multicountry, Countdown 2008 Equity Analysis Group, Multicountry	Equity ratios	Wealth	Family planning	ER = 1.3
			Maternal and newborn care	ER = 2.0
			Immunisation	ER = 1.6
			Treatment of sick children	ER = 1.2
Multicountry, Kunst and Houweling, 2001, Multicountry	Equity ratios	Wealth	SBA	ER = 66.8
			ANC by skilled provider	ER = = 64.1
			Modern contraception	ER = 25.7
			Full immunisation of children 12-23 months	ER = 47.9
Multicountry, Ronsmans et al, 2006	Equity ratios, equity gaps	Wealth	Caesarean section	For 14 countries with overall rates of <2%, ER = 11.4, EG = 3.5%;
				For 13 countries with overall rates of 2-4.9%, ER = 9.3, EG = 8.4%;
				For 15 countries with overall rates of 5%+, ER = 7, EG = 27.5%
Multicountry, 45 LMICs, Howuelin g et al,	Descriptive, exponential curves of the association between	Wealth	Median % ANC	Poor = 58%; rich = 90%
			Median % delivery care	Poor = 24%; rich = 86%

2007	equity ratio and coverage		Comparison of five types of healthcare use	Exponential curves: Inequalities in professional delivery care are systematically larger than inequalities in antenatal care, immunisation, treatment of acute respiratory infection, treatment of diarrhoea.
Namibia, Zere et al, 2010, Namibia	Concentration index, equity ratio, descriptive	Wealth, rural-urban location, maternal education	ANC by skilled provider	Wealth: CI = 0.013* (0.0042, 0.0218); ER = 1.06
				Rural/urban: ER = 1.0
				Maternal ed: uneducated women = 78%; women with secondary+ education = 99%
			Private ANC provider	Wealth: CI = 0.6435* (0.5079, 0.7791); ER = 65.2
				Rural/urban: ER = 6.1
			Public ANC provider	Wealth: CI = -0.0541 (-0.1319, 0.0237); ER = 0.67
				Rural/urban: ER = 0.9
			SBA	Wealth: CI = 0.0943* (0.0457, 0.1429); ER = 1.63
				Rural/urban: ER = 1.3
				Maternal ed: uneducated women = 45%; women with secondary+ education = 98%
			Delivery attended by a doctor	Wealth: CI = 0.4326* (0.2868, 0.5784); ER = 10.6
				Rural/urban: ER = 3.6
			Delivery attended by a nurse/midwife	Wealth: CI = -0.0059 (-0.1047, 0.0929); ER = 0.86
				Rural/urban: ER = 0.98
			TBA	Wealth: CI = -0.4700* (-0.7107, -0.2293); ER = 0.05
				Rural/urban: ER = 0.2
			Delivery in private facility	Wealth: CI = 0.6979* (0.5209, 0.8749); ER = 213
				Rural/urban: ER = 5.9
			Delivery in public facility	Wealth: CI = 0.0607 (-0.0085, 0.1299); ER = 1.3
				Rural/urban: ER = 1.2
			Caesarean section	Wealth: CI = 0.3899* (0.2601, 0.5196); ER = 7.73

				Rural/urban: ER = 3.0
				Maternal ed: uneducated women = 5%; women with secondary+ education = 40%
			PNC	Wealth: CI = 0.0835* (0.0823, 0.0847)
Nepal, Neupane and Doku, 2012	Logistic regression	Wealth, maternal education, rural-urban location	Start ANC after 1st trimester	Wealth: AOR for poorest compared to richest = 1.48 (1.07-2.05)
				Maternal ed: AOR for uneducated compared to primary+ ed = 1.27 (1.05-1.54)
				Ruran/urban: AOR for rural compared to urban women: 1.05 (0.86-1.29)
			Less than 4 ANC	Wealth: AOR for poorest compared to richest = 3.73 (2.65-5.24)
				Maternal ed: AOR for uneducated compared to primary+ ed = 2.04 (1.69-2.47)
				Ruran/urban: AOR for rural compared to urban women: 1.28 (1.04-1.58)
Pakistan, Agha and Carton, 2011	Logisitic regression	Wealth, maternal education	3+ ANC	Wealth: AOR for highest compared to lowest quintile = 1.91***
				Maternal ed: AOR for secondary+ ed compared to uneducated women = 2.96***
			FBD	Wealth: AOR for highest compared to lowest quintile = 1.66**
				Maternal ed: AOR for secondary+ ed compared to uneducated women = 2.99***
			PNC	Wealth: AOR for highest compared to lowest quintile = 2.92***
				Maternal ed: AOR for secondary+ ed compared to uneducated women = 1.84**
			Current use of family planning	Wealth: AOR for highest compared to lowest quintile = 2.06*
				Maternal ed: AOR for secondary+ ed compared to uneducated women = 2.92***
Republic of Vanuatu, Rahman et al, 2011	Logisitic regression	Wealth, maternal education, rural-urban location	ANC by skilled provider	Wealth: AOR for richest compared to poorest women = 1.04 (0.31-3.56)
				Maternal ed: AOR for secondary+ ed compared to no education = 2.24 (1.00-5.83)
				Rural/Urban: AOR for urban compared to rural women =

				0.56 (0.30-2.37)
			SBA	Wealth: AOR for richest compared to poorest women = 5.50 (1.34-22.47)
				Maternal ed: AOR for secondary+ ed compared to no education = 2.08 (1.01-5.23)
				Rural/Urban: AOR for urban compared to rural women = 1.57 (0.51-4.81)
			FBD	Wealth: AOR for richest compared to poorest women = 2.12 (1.02-3.42)
				Maternal ed: AOR for secondary+ ed compared to no education = 1.39 (0.52-3.67)
				Rural/Urban: AOR for urban compared to rural women = 2.55 (0.72-9.05)
Sudan, Ali and Okud, 2013	Logistic regression	Woman's education, husband's education	Unmet need for contracep tion	Woman's ed: AOR for women with less than secondary ed = 7.86*** (5.62-10.98)
				Husband's ed: AOR for husban's with less than secondary ed = 1.91*** (1.36-2.67)
Tanzania, Exavery et al, 2014	Logisitic regression	Wealth, rural-urban location	FBD	Wealth: AOR for richest compared to poorest women = 3.24*** (1.40-7.48)
				Rural/Urban: AOR for urban compared to rural women = 1.44 (0.83-2.51)
Vietnam, Axelson et al, 2012	Concentration index	Wealth, maternal education	Modern family planning	Wealth: 1997, CI = 0.022*; 2006, CI = -0.03*
				Maternal ed: 1997, CI = 0.02*; 2006, CI = -0.0004
			1+ ANC by skilled provider	Wealth: 1997, CI = 0.28*; 2006, CI = 0.06*
				Maternal ed:1997, CI = 0.08*; 2006, CI = 0.05*
			4+ ANC by skilled provider	Wealth: 1997, CI = 0.43*; 2006, CI = N/A
				Maternal ed: 1997, CI = 0.21*; 2006, CI = N/A
			FBD	Wealth: 1997, CI = 0.20*; 2006, CI = 0.12*
				Maternal ed: 1997, CI = 0.06*; 2006, CI = 0.07*
			SBA	Wealth: 1997, CI = 0.14*; 2006, CI = 0.10*
				Maternal ed: 1997, CI = 0.06*; 2006, CI = 0.06*
Vietnam, Malqvist et al 2013	Logisitic regression	Wealth, maternal education, ethnicity	No skilled ANC	Wealth: AOR for poorest compared to other quintiles, 2006 = 2.56 (1.43-4.57); 2010/11 = 4.54 (2.04-10.1)

				Maternal ed: AOR for no compared to some education, 2006 = 2.85 (1.73-4.71); 2010/11 = 7.03 (3.84-12.9)
				Ethnicity: AOR for minority compared to majority group, 2006 = 3.40 (1.88-6.16), 2010/11 = 5.39 (2.58-11.3)
			Home delivery	Wealth: AOR for poorest compared to other quintiles, 2006 = 2.84 (1.78-4.51); 2010/11 = 4.69 (2.34-9.39)
				Maternal ed: AOR for no compared to some education, 2006 = 3.48 (2.00-6.04); 2010/11 = 3.39 (1.85-6.21)
				Ethnicity: AOR for minority compared to majority group, 2006 = 4.67 (2.94-7.43), 2010/11 = 18.8 (8.96-39.2)
Zimbabwe, Muchabaiwa et al, 2012	Logisitic regression	Wealth, maternal education, rural-urban location	ANC	Wealth: OR of richest compared to poorest = 1.84**
				Maternal ed: OR for higher ed compared to no education = 4.84***
				Rural/urban: OR for urban compared to rural women: 0.78
			FBD	Wealth: OR of richest compared to poorest = 6.44***
				Maternal ed: OR for higher ed compared to no education = 17.7***
				Rural/urban: OR for urban compared to rural women: 3.49***
			PNC	Wealth: OR of richest compared to poorest = 0.71
				Maternal ed: OR for secondary ed compared to no education = 1.04
				Rural/urban: OR for urban compared to rural women: 0.89
*p<0.1, **p<0.5, ***p<0.01				
ANC = antenatal care; SBA = skilled birth attendance; FBD = facility based delivery; PNC = postnatal care; TBA = traditional birth attendant				
OR = odds ratio; AOR = adjusted odds ratio; CI = concentration index; ER = equity ratio; EG = equity gap; RR = rate ratio; SII = slope index of inequality; RII = relative index of inequality				

Appendix 2 ID Poor Tool

HOUSEHOLD QUESTIONNAIRE FOR IDENTIFICATION OF POOR HOUSEHOLDS

SECTION A

(INTERVIEWER: Please fill in before going to interview the household)

1. ID Code:									—				
	Province		**District**		**Commune**		**Village**			**Household**			

2.	Name of head of household:	
3.	Capital Province:	
4.	Municipality District Khan:	
5.	Commune Sangkat:	
6.	Village:	

(INTERVIEWER: Please fill in just before starting the interview)

7.	Address of interviewee ((house №, street name/№, if exist):	
8.	Name of interviewee (adult):	
9.	Interview date:	_____ / _____ / 201___
10.	Interviewer's name:	
11.	Does the head of household have a national ID card? What is the ID number?	ID Card No.

DATA ENTRY TEAM TO FILL IN:

12. Name of Data Entry Clerk:	
13. Date of data entry:	_____ / _____ / 201___

Poverty	Poverty Level 1:	59 to 68 points	
Category	Poverty Level 2:	45 to 58 points	Total score from Page 7
Calculation:	Other:	0 to 44 points	

NEEDS DISCUSSION BY VILLAGE REPRESENTATIVE GROUP

SECTION B: DETAILED INFORMATION ABOUT HOUSEHOLD MEMBERS

(INTERVIEWER: Please explain that "only people who share meals from the same pot, or share expenses for food, are considered as one household. Please record all details for all household members.)

	a. Name (surname and first name)	b. Nick Name	c. Relationship to head of household (e.g. head of household, husband/wife, child, nephew/niece)	d. Sex	e. Year of birth	f. Age in full years (if less than 1 year, please write "0")	g. Main activity/ occupation of each household member
1							
2							
3							
4							
5							
6							
7							

SECTION C:

House Situation: ***(INTERVIEWER: Ask Q1 for information <u>but not for scoring)</u>***

Q1. Is this house the property of your household? Or does your household rent it from other people?

(INTERVIEWER: Do not read out)	***(INTERVIEWER:*** ***Please tick one circle below)***	
Not own house and pay rent	○	**Q1** **<u>NO SCORE</u>**
Not own house but don't pay rent	○	
Own house or live with parents	○	

Q2. Main construction material of the house's roof. ***(INTERVIEWER: Observe—do not ask)***

(INTERVIEWER: Do not read out)	**POINTS**	**Q2 SCORE**
- Thatch, palm leaves, plastic sheet, tarpaulin or other soft materials **- OR not own house (rent-free, or paying rent)**	**8**	
Corrugated iron	**4**	
Tiles, fibrous cement, or concrete	**0**	

Q3. Main construction material of the house's exterior walls. ***(INTERVIEWER: Observe—do not ask)***

(INTERVIEWER: Do not read out)	**POINTS**	**Q3 SCORE**
- Saplings, bamboo, thatch, palm leaves, or other soft materials **- OR not own house (rent-free, or paying rent)**	**4**	
Wood, sawn boards, plywood, corrugated iron	**2**	
Cement, bricks, concrete	**0**	

Q4. General condition of the house. ***(INTERVIEWER: Observe—do not ask)***

(INTERVIEWER: Do not read out)	**POINTS**	**Q4 SCORE**
- In dilapidated condition **- OR not own house (rent-free, or paying rent)**	**4**	
In average condition, liveable	**2**	
In good condition and safe	**0**	

Q5. ***(INTERVIEWER: Ask and observe)***: How many meters by how many meters is the floor area of your house?

(INTERVIEWER: Do not read out)	**POINTS**	**Q5 SCORE**
- 20 meters square or less **- OR not own house (rent-free, or paying rent)**	**4**	
21-50 meters	**2**	
51 meters or more	**0**	

Q6a. Which activity is the main income source for your household: growing rice or other crops or orchard; fishing; or other activities?

Growing rice or other crops or orchard	→ *Ask Q6b*	***Ask only one question***
Fishing	→ *Ask Q6c*	
Other activities	→ *Ask Q6d*	

(INTERVIEWER: Ask only households that grow rice, other crops or an orchard as the main source of income)***

Q6b How many *ar* of land does your household use for growing rice, other crops or an orchard? (Please include your own land, land rented from others, and land around the house.)

Unit calculation	**NUMBER OF AR**		***(Interviewer: do not read out)***	**SCORE**
1 kong ≈ 10 ar 1 ha ≈ 100 ar 1 ar = 100 m² 1 rai ≈ 16 ar	□□□	=	From 0 to 20 ar	**8**
			From 20 to 50 ar	**4**
			Over 50 ar	**0**

(INTERVIEWER: Ask only households for whom fishing is the main source of income)***

Q6c. What types of fishing equipment do you have? (not including boats)

(INTERVIEWER: Do not read out)		
Fishing equipment	**Quantity**	**Size and quality**
○ Line hooks	□□	
○ Throw net	□□	
○ Set net	□□	
○ Drag net	□□	
○ Other ***(please specify the types of equipment)***: …… ……	□□	

(Interviewer: Ask only one of these three questions)

Q6 SCORE

(Interviewer must write the score for only one question: Q6b, Q6c or Q6d)

	(INTERVIEWER: Do not read out)	**POINTS**
(INTERVIEWER: Please make your own judgment of the quantity size and quality of the equipment listed above)	None or very little equipment and in poor condition	**8**
	Little equipment and in fair condition	**4**
	Enough equipment and of good quality	**0**

(INTERVIEWER: Ask only households for whom "other activities" are the main source of income for the household)***

Q6d. What activity provides the main source of income for your household?

(INTERVIEWER: Do not read out)	**SCORE**
Work as labourer, supported by others, beg, etc	**8**
Micro business, skilled labourer or job with monthly permanent wage	**4**
Medium- or large-size business	**0**

(Interviewer: Ask only one of these questions, NOT both)

(INTERVIEWER: Ask only households living on land (not on water)***

Q7a. For households living on land. Does your household have pigs? goats? cows? buffaloes? horses? How many..? (count weaners and older). Among these animals, how many do you share *(provas)* with others? ***(INTERVIEWER: Please write the number of animals in the boxes below. Count any animal which is provas as only half an animal.)***

Pigs ☐☐	Cows ☐☐	Buffaloes	☐☐
Goats ☐☐	Horses ☐☐		

And does your household raise fish for sale? Yes○ No○

(INTERVIEWER: Do not read out)	**POINTS**
• No pigs or goats • No cows, buffaloes or horses • **NO** fish raising for sale	10
• 1-3 pigs • OR 1-5 goats • OR 1-2 cows, buffaloes or horses • **NO** fish raising for sale	5
• 4-9 pigs • AND/OR 6-19 goats • AND/OR 3-9 cows, buffaloes or horses • AND/OR does fish raising for sale	0
• 10 or more pigs • AND/OR 20 or more goats • AND/OR 10 or more cows, buffaloes or horses (total)	**Disqualify**

(INTERVIEWER: Ask only households living on water)***

Q7b. For households living on water. Does your household have pigs? How many are weaners and older? Among these pigs, how many do you share *(provas)* with others? ***(INTERVIEWER: Please write the number of pigs in the boxes below. Count any pig which is provas as only half an animal.)***

Pigs ☐☐

And does your household do fish raising for sale? Yes○ No○

(INTERVIEWER: Do not read out)	**POINTS**
• No pigs • No fish raising for sale	**10**

Q7 SCORE

(INTERVIEW-ER: Write the score for Q7a OR Q7b, NOT BOTH)

• 1-3 pigs OR fish raising for sale, but not both	**5**
• 4 or more pigs • AND/OR does fish raising for sale	**0**

Q8. (This question focuss on the Food ability) During the last 12 months, did your household owe rice or borrow rice from other people? For how many months?

Number of months		***(INTERVIEWER: Do not read out)***	**POINTS**
☐☐	**=**	8-12 months	**8**
		3-7 months	**4**
		0-2 months	**0**

Q8 SCORE

Q9a. ***(INTERVIEWER: Please write down the total number of household members by checking the table of all household members in Section B of the questionnaire)*** ☐☐

Q9b. How many persons in your household **cannot** produce an income (because of young or old age, school pupil, poor health, disability, looking after children, or any other reasons)? ☐☐

(INTERVIEWER: Do not read out)	**POINTS**
More than half of all household members	**8**
Equal to or less than a half, but more than one quarter of all household members	**4**
Equal to or less than one quarter of all household members	**0**

Q9 SCORE

Q10. Does your household have … ? How many?

(INTERVIEWER: Please write the number of assets in each box below)			
small radio? ☐	stereo? ☐	colour TV? ☐	video camera? ☐
large radio? ☐	B&W TV? ☐	video player/ karaoke machine? ☐	mobile telephone? ☐
water pump? ☐	threshing machine? ☐	rice milling machine? ☐	generator? ☐
battery charger? ☐			

(INTERVIEWER: Do not read out)	**POINTS**
Nothing or one small radio	**6**
Large radio OR black and white TV OR mobile telephone	**3**
Colour TV and/or stereo and/or video player/karaoke machine and/or water pump	**0**
Video camera or threshing machine or rice milling machine or generator	**Disqualify**

Q10 SCORE

Q11. Does your household have any means of transport? How many?

(INTERVIEWER: Please write the number of means of transport in each box below)			
bicycle? ☐	horse/oxen cart? ☐	kou yon? ☐	small rowboat or canoe (no motor)? ☐
motorbike? ☐	motorbike remorque? TUK TUK? ☐	car/van/ truck? ☐	boat with motor? ☐
tractor? ☐			

(INTERVIEWER: Please calculate the approximate total value of all forms of transportation)	***(INTERVIEWER: Do not read out)***	**POINTS**	**Q11 SCORE**
	(total value <u>less</u> than 150,000 riel) • No means of transportation • OR one old bicycle only • OR one small, old rowboat or canoe	**8**	
	(total value from 150,000 to <u>less</u> than 500,000 riel) • Old bicycle • Very old motorbike • Old horse or oxen cart • Old, medium-size rowboat (<u>without motor</u>)	**4**	
	(total value <u>over</u> 500,000 riel) • Bicycle in fair condition • Motorcycle in fair condition • New horse/oxen cart • New, large rowboat or canoe OR boat with motor • Motorbike remorque • Kou yon (hand tractor)	**0**	
	(very high total value) • Tractor • Car/van/truck	**<u>Disqualify</u>**	

(VILLAGE REPRESENTATIVE GROUP: Please total up all the points from the right-hand column and write the total in the TOTAL SCORE box to the right. <u>SPECIAL NOTE:</u> If any household had animals or assets which earned the "Disqualify" score, please write "DISQUALIFIED" in the box to the right. This means that a household will be given a Total Score of zero.)	**TOTAL SCORE**

SECTION D: ADDITIONAL HOUSEHOLD INFORMATION FOR CONSIDERATION BY VILLAGE REPRESENTATIVE GROUP

Q12. During the last 12 months, did your household suffer from any major problems or crises that caused your household to lose income, have a shortage of food, sell assets, or borrow money?

YES ○ (Let respondent describe the situation)

NO ○ (Interviewer: skip to Q13a)

(INTERVIEWER: Do not read out)	***Please describe***
Serious illness/death of household member(s) ○	
Loss of work of household member ○	
Serious illness/death of animal(s) ○	
Seriously reduced crop production ○	
Theft of property ○	
Other ○	

Q12

Could this situation cause a reduction in living standard?

YES ○

NO ○

If "yes", please also tick at the bottom of the first page of the questionnaire

Q13a. How many children in this household are 6-11 years of age? Please tell their names.

(INTERVIEWER: Please look at Table in Section B and then write the number of children aged 6-11 in the box on the right. If there are no children of aged 6-11, write "00" and go to Q14

Write the names of the children here

……

……

Q13b. How many of the children aged 6-11 years that you just mentioned, missed school for at least 1 month in the last 12 months? (except vacations) ☐☐

Q13

Does this situation show that this household is poor?

YES

(INTERVIEWER: Ask this question if any children missed school in Q13b)

Q13c. For what reason did these children not go to school?

(INTERVIEWER:Do not read out)	***Tick in the circle(s)***
Serious illness	○
Work for others for money or for food	○
Domestic work or taking care of young siblings	○
Long distance to school	○
No money for school fees or uniform	○
Other (please specify)……	○

○

NO

○

If "yes", please also tick at the bottom of the first page of the questionnaire

Q14. **SPECIAL HOUSEHOLD CIRCUMSTANCES WHICH CAUSE REDUCTION IN LIVING STANDARD**

(INTERVIEWER: Please re-check whether this household has any special circumstances which make them vulnerable)

(INTERVIEWER: Do not read out)	***Tick in the circle(s)***
Severely disabled head of household or spouse of head of household (unable to earn income, or spends money for treatment)	○
Head of household or spouse of head of household who is chronically sick (unable to earn income, or spends money for treatment)	○
All adults of the family are elderly, over 60 years of age and no labour forces	○
Divorced or widowed head of household with three or more children who are all under 12 years of age and no labour force	○
No adults (persons aged 18 years or older) living in the	○

Q14

Could this situation cause a reduction in living standard?

YES ○

NO ○

If "yes", please also tick at the bottom of the first page of the questionnaire

household who provide support to the household	
Other ***(INTERVIEWER: Please record the details of the situation)*** ……	○

Q15. **SPECIAL HOUSEHOLD CIRCUMSTANCES WHICH CAUSE IMPROVEMENT IN LIVING STANDARD**

Q15a. In the last 12 months, has your household received assistance from children or other relatives?

NO ○ YES ○→ What kind of assistance was this?

(INTERVIEWER: Do not read out)		
Food	○	What is the approximate monetary value per month? ……
Money	○	Approximately how much per month? ……
Other	○	Please specify……

Q15b. In the last 12 months, were there any other circumstances that improved the living standard of your household?

(INTERVIEWER: Please probe)		
Sell land	○	What was the approximate monetary value? ……
Other	○	Please specify……

Q15

Could this situation cause an improvement in living standard?

YES ○

NO ○

If "yes", please also tick at the bottom of the first page of the questionnaire

Q16. ***(INTERVIEWER: Please consider whether there are any responses or information that is suspicious or untrue?***

Nothing suspicious ○

Suspicious ○ → Please specify……..……..

Appendix 3 Study province selection criteria

Criteria	Source of info	Kampong Thom	Kampong Thom rank	Kampot	Kampot rank	Prey Veng	Prey Veng rank
Poverty level	NIS 2006	33%	1	19%	3	25%	2
Most recent round of ID-Poor	www.mop.gov.kh	2009		2009		2008	
% female headed households	Provincial data books 2009	15.8	3	18.5	1	17.4	2
% adults (15-60 yrs) literate	Provincial data books 2009	79%	1	87%	2	90%	3
Doctors per 1000 population	Calculated myself with data from provincial data books 2009	0.009	3	0.002	1	0.006	2
Nurses per 1000 population	Calculated myself with data from provincial data books 2009	0.247	2	0.188	1	0.313	3
Secondary midwives per 1000 population	Calculated myself with data from provincial data books 2009	0.039	2	0.059	3	0.025	1
Midwives per 1000 population	Calculated myself with data from provincial data books 2009	0.150	3	0.102	1	0.133	2
Unmet need for family planning	DHS 2010	16.2%	3	18.0%	1	16.4%	2
ANC from skilled provider	DHS 2010	85.40%	1	86%	2	92.10%	3
Facility-based deliveries	DHS 2010	36.10%	1	42.20%	3	41.10%	2
No postnatal check-up	DHS 2010	32.80%	2	17.30%	3	42%	1
Total SMH vouchers distributed to date	VRHS Quarterly Reports	890	2	848	1	1785	3
Total FP vouchers distributed to date	VRHS Quarterly Reports	3439	1	4113	2	8079	3

Total SMH vouchers used to date	VRHS Quarterly Reports	1565	1	1879	2	4385	3
Total FP vouchers used to date	VRHS Quarterly Reports	1595	2	1463	1	3075	3
Total SA vouchers used to date	VRHS Quarterly Reports	1680	3	511	2	126	1
Total rank			31		29		36
Ranking scores 3=best, 1=worst							

Appendix 4 Study topic guides

4.1 Topic guide: Women – voucher beneficiaries (users and non-users)

Researcher initials |__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue: _____

Interview Location: _____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To investigate experiences with the voucher programme and perceptions of the accuracy of ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of the voucher programme and the HEF targeting mechanism from target beneficiaries
- ✓ Expected duration
  - 1.5-2 hours
- ✓ Why the participant's cooperation is important
  - Need to know peoples experiences so that implementation of the HEF ID-Poor mechanism and the voucher programme can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

School education level _____

Year of graduation_____

What are the main sources of income in your family _____

Number of children: _____

Age and sex of children:____ M/F

_____ M/F

_____ M/F

_____ M/F

_____ M/F

_____ M/F

Get family tree!

Are you originally from this area/district? Yes / No

How old are you? |__|__|

Now I would like to ask you some questions about your experiences with reproductive and maternal health services

ASK TO SEE ALL HEALTH/POOR CARDS

1. Perceptions of maternal health needs

a. Can you tell me about your healthcare during pregnancy?

Probe: who do you go to for help and advice? When during pregnancy do you go for help or advice?

b. How about during delivery?

Probe: who do you go to for help and advice? When during labour did you go for help or advice?

c. How do you decide whether to seek help during your pregnancy?

Probe: Who do you discuss this with? What is most important for you in making this decision?

d. How do you decide whether to seek help during your delivery?

Probe: Who do you discuss this with? What is most important for you in making this decision?

e. What is the role of your husband in making this decision?

Probes:

- *Who is the main decision-maker?*
- *What proportion of the decision is made by him and what proportion by you?*
- *What happens if you disagree? How do you negotiate and make a final decision?*

- *What does your husband think about whose responsibility it is for RH of you/the family?*

f. What do you think about the healthcare provided to you?

Probe: What value does it have for you? What about it is important for you?

2. Perceptions of reproductive health needs

a. What do you do about birth spacing? What means (services) do you use?

Probe: Do you go to a health centre for help with birth spacing? Can you tell me about that? Why do you use these means?

b. How do you decide to use these means (services)?

Probes: Who do you discuss this with? What is most important for you in making this decision? Who are the people involved in making decisions about birth spacing?

c. What is the role of your husband in making this decision?

Probes:
- *Who is the main decision-maker?*
- *What proportion of the decision is made by him and what proportion by you?*
- *What happens if you disagree? How do you negotiate and make a final decision?*
- *What does your husband think about whose responsibility it is for RH of you/the family?*

d. How do you feel about these means (services)?

Probes: What value do they have for you? What do you think about the facility? What about the staff? What do you like about the services? What don't you like?

3. Perceptions of poverty

a. What do the words 'poor people' mean to you?

b. Who do you think is poor in your village – can you give me some examples?

c. Why do you think they are poor?

Probes: How would you determine that a family is poor in your community? What do other people think about these families?

d. What do you think about the differences between poor and non-poor people in your community?

Probes: Are there any? What are the differences? How big are the differences?

e. How do you feel about these differences?

f. What about the healthcare needs between poor and non-poor women – are they the same or different?

g. What about during pregnancy?

h. What about during delivery?

i. What about for birth spacing?

4. Perceptions of voucher targeting mechanism (ID-Poor)

a. Can you tell me about how people are selected to receive the health cards?

Probes:
- *What happens?*
- *What is the process for getting the card?*
- *Did you have to pay anyone to get it?*
- *Did you give anyone sympathetic money/gratitude when you got your card? Can you tell me about that?*
- *How long did it take to get the card?*

b. What do you think about this process?

Probes: Is there a list of poor HHs in the community? What do you think about the list being made public? Anything you don't like about the process?

c. ***Groups 1, 2 , 3 (HU, HN, NN):*** How do you feel about having a poor card?

Probes: Do you feel happy to have a card? Is there anything about the card that makes you feel unhappy?

d. Do you agree with the list of poor households? Why?

e. Is the list of poor households capturing the people you think are poor? Why?

Probes: Do you know anyone who is not poor who has a poor card? Do you know anyone who is poor who does not have a poor card? How does this happen?

5. Experiences with vouchers for reproductive health services (VRHS)

INDICATE WHICH CARD YOU ARE TALKING ABOUT

a. Can you tell me about the VRHS voucher programme in Kampong Thom?

Probes: Where and how did you find out about it? Anything else?

b. ***Group 1 and 4 (HU, RHU)****:* Can you tell me about when you used the voucher?

Probes: How/where did you get the voucher? What services did you use it for? How long after getting the voucher did you use it? Did you have to get referred to a hospital? How did this work with the HEF? And then what happened?

c. ***Group 1 and 4 (HU, RHU)****:* There are many different things you can use the voucher for, which one do you like the most?

d. ***Group 2 and 4 (HN, RHU)****:* Can you tell me about why you have not used your voucher?

Probes: How/where did you get the voucher? How long have you had the voucher for?

e. ***Group 3 (NN)****:* Have you tried to get a voucher? Can you tell me about that? Can you tell me about why you have not received or used a voucher?

6. Perceptions of the voucher programme

a. What do you think about the voucher programme?

Probes: What value does the programme have for you? Why?

b. ***Group 1 and 4 (HU, RHU)****:* How do you feel about using being a voucher-user/holder?

c. What do other people think about voucher users (or holders)?

Probes: Is the voucher something people approve of in your community? What does using the voucher say about your position/status within your community?

7. Perceptions of the voucher services

a. ***Groups 2, 3 and 4 (HN, NN, RHU):*** What do you think about service provision for people with and without a voucher?

Probe: Are they different? Are they the same? How? What do you think about the staff at the facilities? Do they treat voucher users differently to women without a voucher?

b. ***Group 1 and 4 (HU, RHU):*** Can you tell me about your experience using your voucher? What did you think of the facility and staff?

Probe: Are the services different to what you get if you don't use a voucher? How? Do the staff treat you differently to women without vouchers? How?

c. ***Group 1 and 4 (HU, RHU):*** Did you have to pay any money when you used your voucher?

Probe: Can you tell me about that?

d. ***Group 1 and 4 (HU, RHU):*** Would you **use** the voucher service again in the future? Why? (CLARIFY USE, NOT JUST TO HAVE)

8. Other social health protection schemes in Cambodia

a. Besides the voucher, is there any other similar schemes/card/voucher for poor people to use health services?

Probes:
- *Community-based health insurance?*
- *Other vouchers? For what? What is their name?*
- *HEF?*
- *Anything else?*

b. What do you think about each of these programmes and the services they give access to?

Probes: What value do they have for you?

c. Which one do you like the most? Why?

d. Which one is the most important for you? Why?

Probes: Are there any services that these schemes don't provide access to that you think they should? What about these services is important to you?

e. Do you/have you ever used any of these? If so, which ones?

If yes: How did you decide to use this/these scheme(s) out of the others available?

Probes: What did you like most about the scheme you chose? What was most important for you in deciding to use this scheme? Who did you talk to about using this scheme or the others? Do you use different schemes to access different types of services?

f. From your perspective, how well do all the schemes fit together?

Probes: Do you think the schemes compliment each other? Coverage? Location? Accessibility? Why? How?

9. Social and health status of women within the family?

a. If you are sick and if your husband is sick, which of these creates the most problems for your family? Why?

Probes: What are the problems that this creates for your family/children/spouse?

b. How would you rank the importance of health of members of your family? Why in this order?

Probes: Why this person at top/bottom? Why are you at the bottom?

c. Has the voucher made any difference to how you see the importance of your own health within your family? Why?

d. What is the role of Khmer women?

Probe: What about within the family? Within the community? How does womens' status compare to that of men? Why is this?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

4.2 Topic guide: Voucher promoters

Researcher initials |__|__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue:_____

Interview location:_____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To learn about experiences with the voucher programme and perceptions of the accuracy of ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of the voucher programme and the HEF targeting mechanism from its implementers, and perceptions of other social health protection programmes in Kampong Thom
- ✓ Expected duration
  - 1.5-2 hours
- ✓ Why the participant's cooperation is important
  - Need to know their experiences so that implementation of the HEF ID-Poor mechanism and the voucher programme can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

School education level _____

Year of graduation_____

Years worked with programme |__|__|yrs |__|__|mths

Are you originally from this area/district? Yes / No

How old are you? |__|__|

Now I would like to ask you some questions about your experiences with the voucher programmes

1. The VRHS programme

a. Can you tell me what the VRHS programme is and what it does?

b. Can you tell me about your role?

c. Approximately how many days per month do you work on the programme?

d. What do you do on these days?

Probes:

- *How do you identify people to receive a voucher? How are they selected?*
- *What do you discuss with them when you give them the voucher? Anything else?*

e. When you have given people the vouchers, can you tell me about any further contact you have with them?

Probes: Do you follow up with them to see if they have used it? Can you tell me about this? If not, why?

f. What do you think about the voucher scheme?

g. What are peoples perceptions about the women who receive the vouchers?

Probes:

- *How do you see them?*
- *Do you think they are all in need of the voucher? Why?*
- *Do you think they are different from other people in the community? Why?*

2. Perceptions of the VRHS/HEF targeting mechanism

a. What do you think about the process for selecting people to receive the vouchers?

Probes:

- *Do you think the vouchers are getting to the right people? Why?*
- *Who do you think are the right people?*
- *Do you know anyone with a card who shouldn't have it?*
- *Do you know anyone without a card who should have it?*

b. What do you think about displaying the list of poor households in public?

c. From the eyes of the community, what do people think about the families on that list?

Probes:

- *Are they seen as the same or different to others in the community? Why?*

d. Do you ever hear of people giving sympathetic money/gratitude to receive the poor card or vouchers? Can you tell me about that?

3. Perceptions of the voucher services

a. What do you think about the services that can be used with the vouchers?

b. What do you think about the staff at the facilities? Do you hear about the staff treating voucher clients differently to paying clients?

Probes: Would you use these facilities yourself? Would you be happy for your wife to use them? Why? Are they different to the services and treatment given to women without vouchers? How?

4. Perceptions of poverty

j. What do the words 'poor people' mean to you?

k. Who do you know in your community who is poor – can you give me some examples? Why do you think they are poor?

Probes: How would you determine that a family is poor in your community? What do other people think about these families?

l. What do you think about the differences between poor and non-poor people in your community?

Probes: Are there any? What are the differences? How big are the differences?

m. How do you feel about these differences?

n. For poor women, what do you think are the health service needs during their pregnancy?

o. For poor women, what do you think are the health service needs during delivery?

p. For poor women, what do you think are the health service needs for birth spacing?

5. Other social health protection schemes in Cambodia

a. Besides the voucher, is there any other similar schemes/card/voucher for poor people to use health services?

Probes:
- *Community-based health insurance?*
- *Other vouchers? For what? What is their name?*
- *HEF?*
- *Anything else?*

b. What do you think about each of these other schemes?

c. Which one do you like the most? Why?

d. Which one is the most important for you? Why?

Probes: Are there any services that these schemes don't provide access to that you think they should? What about these services is important to you?

e. From your perspective, how well do all the schemes fit together?

Probes: Do you think the schemes compliment each other? Coverage? Location? Accessibility? Why? How?

f. What do you think all the programmes should do to fit together better?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

4.3 Topic guide: VRG members

Researcher initials |__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue:_____

Interview location:_____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To learn about experiences of the voucher programme and perceptions of the accuracy of the ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of the HEF and its targeting mechanism amongst community members, and perceptions of other social health protection programmes in Kampong Thom
- ✓ Expected duration
  - 1.5-2 hours
- ✓ Why the participant's cooperation is important
  - Need to know people's experiences so that the accuracy of the HEF ID-Poor can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

Organisation _____

School education level _____

Year of graduation_____

Are you originally from this area/district? Yes / No

How old are you? |__|__|

Now I would like to ask you some questions about your experiences with the HEF programme.

1. Perceptions of the HEF targeting mechanism

a. Can you tell me about the VRG and your role within it?

Probes: What are your responsibilities?

b. Can you tell me what the HEF programme is and what it does?

c. How does the programme identify people to receive a card? How are they selected?

d. What do you think about this selection process?

Probes:

- *What do you think about the list of poor households in your community?*
- *Who do you think should be receiving cards through this process?*
- *Are those people receiving the cards?*
- *Do you know anyone who is not poor who has a poor card?*
- *Do you know anyone who is poor who does not have a poor card?*

e. What do people think about the families on the poor household list?

f. Have you heard of families having to pay to receive their card?

Probes: If so, how/why do you think this is happening?

g. Besides this, what were the other main challenges for you and your group in selecting poor households?

h. When you do it next time, how would you like to make the ID-Poor process better?

i. What do you think are the positives and negatives of the HEF programme compared to having free care for everyone?

2. Perceptions of HEF services

a. What do you think about the services that can be used with the HEF card?

Probes: Would you be happy to use these services yourself? Do you use these services yourself? How would you compare the services provided with HEF scheme to other services?

b. What do you think about the staff working at these facilities?

Probes: Do the staff treat HEF patients differently to non-HEF patients? How?

3. Perceptions of poverty

q. What do the words 'poor people' mean to you?

r. Who do you think is poor in your village – can you give me some examples?

s. Why do you think they are poor?

Probes: How would you determine that a family is poor in your community? What do other people think about these families?

t. What do you think about the differences between poor and non-poor people in your community?

Probes: Are there any? What are the differences? How big are the differences?

u. How do you feel about these differences?

v. For poor women, what do you think are the health service needs during their pregnancy?

w. For poor women, what do you think are the health service needs during delivery?

x. For poor women, what do you think are the health service needs for birth spacing?

4. Other social health protection schemes in Cambodia

g. Besides the HEF, is there any other similar schemes/card/voucher for poor people to use health services?

Probes:
- *Community-based health insurance?*
- *Other vouchers? For what? What is their name?*
- *HEF?*
- *Anything else?*

h. Can you tell me those programmes?

Probes:
- *What services can they be used for?*

- *How do people get into the scheme? Do they have to have any assessment?*
- *Once in the scheme, how do people then use it to use health services?*

i. What do you think about these other schemes?

j. Which one do you like the most? Why?

k. Which one is the most important for you? Why?

Probes: Are there any services that these schemes don't provide access to that you think they should? What about these services is important to you?

l. From your perspective, how well do all the schemes fit together/compliment each other?

Probes: Do you think the schemes compliment each other? Coverage? Location? Accessibility? Why? How?

m. What do you think all the programmes should do to fit together/compliment each other better?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

4.4 Topic guide: VMA Staff

Researcher initials |__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue:_____

Interview location:_____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To learn about experiences with the voucher programme and perceptions of the accuracy of ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of the voucher programme and the HEF targeting mechanism from its implementers, and perceptions of other social health protection programmes in Kampong Thom
- ✓ Expected duration
  - 1.5-2 hours
- ✓ Why the participant's cooperation is important
  - Need to know their experiences so that implementation of the HEF ID-Poor mechanism and the voucher programme can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

School education level _____

Year of graduation_____

Years worked at facility |__|__|yrs |__|__|mths

Are you originally from this area/district? Yes / No

How old are you? |__|__|

Now I would like to ask you some questions about your experiences with the voucher programmes

1. The VRHS programme

a. Can you tell me what the VRHS programme is and what it does?

b. What do you think about the voucher programme?

h. What are peoples' perceptions about the women who receive the vouchers?

Probes:
- *What do you think about them?*
- *Do you think they are all in need of the voucher? Why?*
- *Do you think they are different from other people in the community? Why?*

2. Perceptions of the VRHS/HEF targeting mechanism

a. What do you think about the process for selecting people to receive the vouchers?

Probes:
- *Do you think the vouchers are getting to the right people? Why?*
- *Who do you think are the right people?*
- *Do you know anyone with the card who you think shouldn't have it?*
- *Do you know anyone without the card who you think should have it?*

c. What do you think about displaying the list of poor households in public?

e. From the eyes of the community, what do people think about the families on that list?

Probes:
- *Are they seen as the same or different to others in the community? Why?*

b. Do you ever hear of people giving sympathetic money/gratitude to receive the poor card or vouchers? Can you tell me about that?

3. Perceptions of the voucher services

c. What do you think about the services that can be used with the vouchers?

d. What do you think about the staff at the facilities? Do you hear about the staff treating voucher clients differently to paying clients?

Probes: Would you use these facilities yourself? Would you be happy for your wife to use them? Why? Are they different to the services and treatment given to women without vouchers? How?

4. Perceptions of poverty

a. What do the words 'poor people' mean to you?

b. Who do you know in your community who is poor – can you give me some examples? Why do you think they are poor?

Probes: How would you determine that a family is poor in this area? What do other people think about these families?

c. What do you think about the differences between poor and non-poor people in this area?

Probes: Are there any? What are the differences? How big are the differences?

d. How do you feel about these differences?

e. For poor women, what do you think are the health service needs during their pregnancy?

f. For poor women, what do you think are the health service needs during delivery?

g. For poor women, what do you think are the health service needs for birth spacing?

5. Other social health protection schemes in Cambodia

n. Besides the voucher, is there any other similar schemes/card/voucher for poor people to use health services?

Probes:

- *Community-based health insurance?*
- *Other vouchers? For what? What is their name?*
- *HEF?*
- *Anything else?*

o. What do you think about each of these other schemes?

p. Which one do you like the most? Why?

q. Which one is the most important for you? Why?

Probes: Are there any services that these schemes don't provide access to that you think they should? What about these services is important to you?

r. From your perspective, how well do all the schemes fit together?

Probes: Do you think the schemes compliment each other? Coverage? Location? Accessibility? Why? How?

s. What do you think all the programmes should do to fit together better?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

4.5 Topic guide: Service providers

Researcher initials |__|__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue:_____

Interview location:_____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To learn about experiences of the voucher programme and perceptions of the accuracy of ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of service providers of the voucher programme and the HEF targeting mechanism, and perceptions of other social health protection programmes in Kampong Thom
- ✓ Expected duration
  - 1.5-2 hours with consecutive translation
- ✓ Why the participant's cooperation is important
  - Need to know relevant peoples' experiences so that implementation of the HEF ID-Poor mechanism and the voucher programme can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

School education level _____

Year of graduation_____

Years worked at facility |__|__|yrs |__|__|mths

Are you originally from this area/district? Yes / No

How old are you? |__|__|

What grade of clinician are you?

How many years of study and training did you do?

Grade □ Doctor |__|__| yrs
□ Medical Assistant |__|__| yrs
□ Staff Nurse |__|__| yrs
□ Community Health Nurse |__|__| yrs
□ Midwife |__|__| yrs
□ Other _____ |__|__| yrs

Now I would like to ask you some questions about your experiences with the voucher and HEF programmes.

1. The VRHS programme

a. What cards or exemptions are there in this area that can give free access to health care for the poor?

Probe: Can you tell me about them?

b. Can you tell me about the VRHS programme and what it does?

c. Can you tell me about any examples of voucher clients who have been treated at your facility?

Probes:
- *What happened when they first arrived*
- *Then what happened?*
- *What happens if you need to refer a voucher patient on to higher-level care? How does that work with paying for their services?*

d. What services do people tend to come and use at your facility with a voucher? Can you tell me about examples of these?

e. What do you think about the VRHS programme?

f. What do you think about the people who come to your facility with a voucher?

Probes:
- *How do you see them?*
- *Do you think they are all in need of the voucher? Why?*

- *Is there anything different about them compared to other people in the community? Why?*
- *What are the similarities in services or treatment received between people with and without vouchers?*
- *What are the differences in services or treatment received between people with and without vouchers?*

g. Have you had any experiences of clients offering you sympathetic money (tea money/gratitude)? Can you tell me about this? Why do you think they do this? How bad a problem do you think this is?

2. Perceptions of the VRHS/HEF targeting mechanism

f. What do you think about the process for selecting people to receive the vouchers?

Probes:
- *Do you think the vouchers are getting to the right people? Why?*
- *Who do you think are the right people?*
- *Have you ever experienced a non-poor client who has a voucher in your facility?*
- *How do you think they got the voucher?*

g. What do you think about displaying the list of poor households in public?

h. From the eyes of the community, what do people think about the families on that list?

Probes:
- *Are they seen as the same or different to others in the community? Why?*

3. Perceptions of poverty

y. What do the words 'poor people' mean to you?

z. Who in this community is poor – can you give me some examples? Why do you think they are poor?

Probes: How would you determine that a family is poor in your community? What do other people think about these families?

aa. What do you think about the differences between poor and non-poor people in your community?

Probes: Are there any? What are the differences? How big are the differences?

bb. How do you feel about these differences?

cc. For poor women, what do you think are the health service needs during their pregnancy?

dd. For poor women, what do you think are the health service needs during delivery?

ee. For poor women, what do you think are the health service needs for birth spacing?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

4.6 Topic guide: HEFO/HEFI Staff

Researcher initials |__|__| **Facilitator initials:** |__|__|

Participant ID No: |__|__|__|__|__|/|__|__|/|__|__|__|/|__|__|__|__|__|/_____

Gender: Male / Female

Time start:_____ **Time stop:**_____

Interview venue:_____

Interview location:_____

Introduction

I am _____ from _____

- ✓ General purpose of the study
  - To learn about experiences with the voucher programme and perceptions of the accuracy of ID-Poor targeting mechanism
- ✓ Aims of the interview
  - To understand experiences and perceptions of HEF and its targeting mechanism amongst HEF staff, and perceptions of other social health protection programmes in Kampong Thom
- ✓ Expected duration
  - 1.5-2 hours
- ✓ Why the participant's cooperation is important
  - Need to know their experiences so that accuracy of the HEF ID-Poor can be improved
- ✓ What will happen with the collected information
  - Results of the study will be presented to HEF and VRHS staff, service providers and programme beneficiaries in Kampong Thom, distributed to Ministry of Health and Ministry of Planning. We also aim to publish results internationally, and the study will make up part of a submission for PhD thesis in UK.
- ✓ Confidentiality
- ✓ Any questions?
- ✓ Consent
- ✓ Tape recorder (consent)

Demographic & work history

Can I ask some details about you and your job?

Job Title (e.g. in charge) _____

Organisation _____

School education level _____

Year of graduation_____

Years worked at organisation |__|__|yrs |__|__|mths

Are you originally from this area/district? Yes / No

How old are you? |__|__|

Now I would like to ask you some questions about your experiences with the HEF programme.

1. Perceptions of the HEF targeting mechanism

j. Can you tell me what the HEF programme is and what it does?

k. How does the programme identify people to receive a card? How are they selected?

l. What do you think about this selection process?

Probes:

- *What do you think about the list of poor households in your community?*
- *Who do you think should be receiving cards through this process?*
- *Are those people receiving the cards?*
- *Do you know of people who are not poor who have ID-Poor cards?*
- *Do you know of people who are poor who do not have ID-Poor cards?*

m. What do people think about the families on the poor household list?

n. Have you heard of families having to pay to receive their card?

Probes: If so, how/why do you think this is happening?

o. Besides this, what are the other main challenges for you and your group in selecting poor households?

p. When you do it next time, how would you like to make the ID-Poor process better?

q. What do you think are the positives and negatives of the HEF programme compared to having free care for everyone?

2. Perceptions of poverty

ff. What do the words 'poor people' mean to you?

gg. When you look at this community/Cambodia, what is it like to be poor?

Probes: How would you determine that a family is poor in your community? What do other people think about these families?

hh. What do you think about the differences between poor and non-poor people in your community?

Probes: Are there any? What are the differences? How big are the differences?

ii. How do you feel about these differences?

jj. For poor women, what do you think are the health service needs during their pregnancy?

kk. For poor women, what do you think are the health service needs during delivery?

ll. For poor women, what do you think are the health service needs for birth spacing?

3. Other social health protection schemes in Cambodia

t. Besides the HEF, is there any other similar schemes/card/voucher for poor people to use health services?

Probes:
- *Community-based health insurance?*
- *Other vouchers? For what? What is their name?*
- *HEF?*
- *Anything else?*

u. Can you tell me those programmes?

Probes:
- *What services can they be used for?*
- *How do people get into the scheme? Do they have to have any assessment?*
- *Once in the scheme, how do people then use it to use health services?*

v. What do you think about these other schemes?

w. Which one do you like the most? Why?

x. Which one is the most important for you? Why?

Probes: Are there any services that these schemes don't provide access to that you think they should? What about these services is important to you?

y. From your perspective, how well do all the schemes fit together?

Probes: Do you think the schemes compliment each other? Coverage? Location? Accessibility? Why? How?

z. What do you think all the programmes should do to fit together better?

Thank you very much for you time today – that is all that I wanted to talk about with you. Do you have anything else you want to add to our discussion today? Any other comments or questions?

Appendix 5 Standard Operating Procedures for Qualitative Research

5.1 APPROACHING AND INVITING PARTICIPANTS TO INTERVIEWS

I. PURPOSE. To describe the procedures for approaching individuals to participate in in-depth interviews.

II. RATIONALE. We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Ethics approval letter
- Information Sheet
- Consent form
- Participant enrolment sheets (x4)
- List of HU, HN, NN women in urban and rural communes, Kampong Thom
- In-depth interview topic guides
- Notepad
- Pens
- Tape recorder
- Spare batteries

IV. TARGET AUDIENCE

- Research team

V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Approaching the health facility

- Prior to the start of the fieldwork, the research team will meet with local officials, PIs, SPs and community representatives to discuss the study and plans for the data collection.

- All in-depth interviews will be conducted by two research team members - one interviewer/note-taker and one translator.

- Once a potential participant has been identified, the interview team should approach them either at home (women) or in their place of work (PIs and SPs), and introduce themselves.

- If the individual cannot be found, this should be noted in the 'contact successful' column of the enrolment form (write 'N') and attempt to find the best time to return (note this in 'successful contact?' column').

- The same approach and introduction procedures should be used on subsequent visits.

- If the individual cannot be located on subsequent visits, the interview team should record the date that the final visit was made in the enrolment form (Date Complete column) and note that an interview was not conducted.

B. Introduction to participants and completion of enrolment forms

- If a participant is identified and located, their details should be entered into the relevant enrolment form. We expect to enrol approximately 40 participants from across the 3 groups (women, PIs and SPs) into the study in total.

- Record the date contact was made ('date approached' column), all necessary contact information e.g. the sub-group they are eligible for, and the arranged date of the interview.

- Introduce the study participants as outlined in the script below.

Script for inviting potential participants

"Hello. My name is Antonia and I am a student from a University in London. I am doing research for my PhD in Kampong Thom, looking at use of reproductive and maternal health services, as well as the voucher programme and the HEF. We would like to know about peoples experiences with and perceptions of both the voucher programme here and the HEF. To do this we are speaking with selected users and potential users of the programme, programme staff and service providers. We are interested in interviewing you as part of our study. Can we tell you more about the interviews?

- The introductions, informed consent discussions, and interviews will be conducted in Khmer or English, at the preference of the participant.

- If the participant appears interested, but does not currently have time to review the information sheet, agree a date and time to return and record this on the enrolment form, and write 'Y' in the 'interested?' column.

- If the participant is not interested, record "N' in the 'interested?' column (along with any reason, if given). Record the date that the final contact was made with this participant in the 'date complete' column.

C. Reviewing the information sheet and obtaining verbal consent from participants

- If the participant is agreeable, proceed with the information sheet and the consent process (**SOP 2**).

- If the participant gives their consent to participate in the survey, write 'Y' in the 'interested?' column in the enrolment form. If the participant is able, proceed immediately with the interview (for all contact made after piloting – for any contact made before piloting, arrange a time to return for the interview after the piloting). If the participant is not able to participate in the interview immediately, reschedule the interview and record the return date in the enrolment form (IDI arranged date column).

- When the interview is successfully completed, record the date in the column labelled 'Date COMPLETE'.

5.2 GIVING INFORMATION AND GETTING CONSENT (INTERVIEWS)

I. PURPOSE. To describe the procedures for giving information to potential participants, inviting them to participate in the study and getting their consent, as part of the recruitment process.

II. RATIONALE. We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Ethics approval letter
- Information Sheet
- Consent form
- Participant enrolment sheets (x4)
- List of HU, HN, NN women in urban and rural communes, Kampong Thom
- In-depth interview topic guides
- Notepad
- Pens
- Tape recorder
- Spare batteries

IV. TARGET AUDIENCE

- Research team

V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Giving information about the study

- Prior to commencing this SOP, the correct procedures for identifying and inviting participants to participate in the study must have been followed (see **SOP 1**).

- If the participant has expressed interest in finding out about the study and potentially participating, explain to them that you will give them more detailed information about what participating in the study will involve, so they can choose whether or not they wish to participate.

- If the participant has *not* expressed interest, or states that they do not wish to find out more about the study as they are not interested in participating, thank them for their time and allow them to leave.

- Establish whether the participant wishes to read through the information sheet themselves (and which language is preferred) or whether they would prefer you to read through the sheet with them.

- If reading the information sheet to the participant, be sure to read slowly and clearly with sufficient pauses to make sure they are listening and understanding. If perceived necessary, briefly summarise the key points of the study and the nature of the participation using the script below, to ensure comprehension.

- If the participant is reading the information sheet themselves, when they have finished give a quick summary of the information, including key points about the nature of their participation and its consequences, to check comprehension (see script below).

Script for summarising the study and nature of participating

"So to summarise, the aim of the study is to explore peoples experiences with and perceptions of the voucher and HEF programmes in Kampong Thom, and as XXXX (fill in relevant group) opinions on this topic are valuable we are inviting them to participate in an interview. If you wish to participate, you would be asked to attend 1 interview, which would last between 1-2 hours and, with your consent, would be recorded. The data from the interview would be kept confidential and your name would be anonymised. The benefits of participating are that your experiences and opinions will help us to improve the implementation of the voucher programme in the future. The disadvantages are that it will require some of your time. Participation is voluntary and you can choose to withdraw at any time. If you have any further questions or complaints about the study you can contact me (Antonia) on 0977940341, or through my translator, Sophea on 012519619."

- Ask the participant if they have any questions about the study or if there are any parts of the information sheet that they do not fully understand. Answer any questions or queries fully and check their comprehension of your answers.

- Reiterate that participation is voluntary, and should they consent to participate, they may withdraw from the study at any time.

- Ask if they would like to keep a copy of the information sheet, and in which language. Give them the information sheet, as appropriate.

B. Inviting participation

- Once the information sheet has been read through and/or explained, and all questions about the study have been answered, ask if they wish to participate in the study.

- If they say 'yes', write 'Y' in the 'interested?' column on the enrolment form. Move onto section C, procedures for getting consent.

- If they say 'no', write 'N' in the ''interested?' column on the enrolment form and indicate any reason for not participating. Record the date in the final column labelled 'Date COMPLETE'. Thank them for their time and allow them to leave.

- If they are unsure, record that you will 'Come back later' on the enrolment form (interested? column) and arrange a date to return or contact them again. Thank them for their time and allow them to leave.

C. Obtaining consent from participants

- Depending on the participants preference ask them to read through the consent form, or read it aloud to them in the appropriate language.

- Ask them whether they consent to each of the statements on the consent form.

- If they do consent, ask them to tick the box next to each statement and to record their signature, printed name and the date in the appropriate area of the consent form.

- If they consent to participating in the study but not to one or more of the other statements, ask them to circle the correct response next to each statement and to record their signature, printed name and the date in the appropriate area of the consent form. Be sure to make note of to which statements – for example, recording the interview – the participant *does not* consent.

- If the participant is not able to write their name or signature, the interviewer should complete their printed name and date for them and ask them to give a thumb print in place of a signature.

- The interview should then print and sign their name, and record the date on the consent form.

- If the participant does not consent to participating in the study, ask whether they wish to have more time to think about it. If they answer yes, arrange a time and date to contact them again and record 'Come back later' and the arranged day and time on the enrolment form.

- If the participant does not wish to think more about participation and is no longer interested, record 'N' in the 'interested?' column of the enrolment form and the date under 'Date COMPLETE'.

- For the participants who agree to participate, ask whether they are available to complete the interview immediately (once piloting has been completed). If so, move onto **SOP 3** and **SOP 4**, to organise and conduct the interview.

- If the participant is not able to participate in the interview immediately, reschedule the interview and record the date in the enrolment form.

- When the interview is successfully completed, record the date in the column labelled 'Date COMPLETE'.

5.3 Organising the interview

I. PURPOSE. To describe the procedures for organising interviews with participants.

II. RATIONALE. We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Ethics approval letter
- Information Sheet
- Consent form
- Participant enrolment sheets (x4)
- List of HU, HN, NN women in urban and rural communes, Kampong Thom
- In-depth interview topic guides
- Notepad
- Pens
- Tape recorder
- Spare batteries

IV. TARGET AUDIENCE

- Research team

V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Organising a venue for the IDI

- The study team should work with local officials to identify appropriate venues for the IDIs. Ideally, venues should be away from the main health facility, easily accessible to participants, quiet, relatively private and free from distractions. Potential venues include school buildings, community centres, church halls or a room at the research team's office base.

- Arrangements should be made regarding the possibility of young children accompanying participants to the interview, to ensure they are cared for and do not cause too much disruption to the interview.

- Communicate the location of the venue to the participants at least 3 days before the scheduled interview and agree arrangements for reimbursement of transport costs.

- If possible, contact the participant again the day before the interview to remind them and to confirm that they are still able to attend.

B. Arranging transport to the venue

- Participants will be responsible for arranging their own transport to the interview venue, but will be reimbursed for the cost at the end of the interview.

- Funds and documentation for reimbursing transport costs should be arranged in advance of the interviews.

C. Arranging equipment and materials

- Prior to the interview, the interviewer (and other staff) should ensure they have all the necessary materials and equipment ready, including enrolment form, topic guide, contact summary form, note-taker's form and copies of the participant information sheet and signed consent form. Equipment required includes digital voice recorder, spare batteries, note paper and pens.

- The equipment, particularly the voice recorder, should be tested before the interview to check that it is working and the interviewer is confident in using it.

- The interviewer (and note-taker, where appropriate) should seek to be at the interview venue half an hour before the scheduled interview time to arrange the equipment and set up the room.

- At the interview venue, the furniture (chairs and table) should be in a welcoming arrangement. The digital voice recorder should be placed centrally, in close proximity to both the interviewer and participant to record the interview successfully. and also suitable for recording the interview on the digital recorder.

- If a translator is to be used throughout the interview, arrangements on how the translation will be carried out should be agreed by the research team prior to any interviews being carried out, and recorded in an SOP (see **SOP x**).

5.4: CARRYING OUT THE INTERVIEW

I. PURPOSE. To provide interviewers with a uniform and standard way of conducting in-depth interviews.

II. RATIONALE. We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. METHOD.
Face-to-face interviews will be conducted by the research team (interviewer and translator) with every selected participant who consents to participate and the interviewer will record all the responses made by the participant, in hand-written notes and using a digital recorder if consent is given. This will be a one-time only involvement of this participant.

V. SUPPLIES AND MATERIALS

- Ethics approval letter
- Information Sheet
- Consent form
- Participant enrolment sheets (x4)
- List of HU, HN, NN women in urban and rural communes, Kampong Thom
- In-depth interview topic guides
- Notepad
- Pens
- Tape recorder
- Spare batteries

V. DEFINITIONS:

- **Topic guide:** The topic guide has a list of topics to be explored.

VI. PROCEDURES

- When the consent form has been completed, inform the participant that you will begin an in-depth interview, which will request them to express their own views or opinions about the voucher and HEF programmes. Remind them about their voluntary participation in the voice recording.

A Sample introductory statement would go as follows:

"Now that we have completed the consent form, we will now ask you to express your own views and experiences about the voucher and/or the HEF programme. I will be writing down what you say for our records but these notes will be kept securely and your name will not be used anywhere. Your answers will be looked at together with those of other participants from different communities and you will not be identifiable in any reports that are published.

It is very important for us to hear your views and experiences because you have experience with the programmes and can give us this insight. We hope you will have time to spend with us now to complete this. I am going to turn on the voice recorder now. Don't forget, you can ask me to turn this off at any time.

Do you have any questions before we start?"

Turning on the voice recorder

- Turn on the voice recorder and show the participant the light indicating it is recording. Speak clearly and loudly enough for the recording and encourage the participant to do so too. Ask them to repeat any quiet statements but try to allow them to speak freely without fear of the recording.

- The interviewer will make the respondent aware that they will be taking notes during the interview and this may require, for example, pausing the interview at regular intervals to ensure that all information gets recorded.

Demographic details

- The demographic details of the participant should be asked and the detail included in the notes. If the interviewer prefers, these questions can be completed at the end of the interview.

- Remember to label each page of the notes with the participant's study ID so that you will be able to remember to whom it belongs.

Following the topic guide

- The interviewer should follow the topic guide, but allow the pace to be set by the interviewee. They should follow-up all general statements made by the respondent with a probe, particularly bearing in mind the purpose of the research.

- The interviewer will follow the recommendations for seating position, asking good questions and active listening from the training.

- The interviewer should make brief notes on their topic guide that notes down the main items discussed during the interview (this is useful if topics are covered in advance by the respondent and for the contact summary).

- The interviewer (note taker) will write down all questions and responses given on blank sheets of paper, in verbatim (word for word) as far as possible as well as recording the exact questions asked and in the order they were asked.

- The interviewer (note taker) will also write a summary of the context of the interview - the first page of the notes will be dedicated to this, with details of the immediate setting and atmosphere of the interview and of the surrounding people, activities and infrastructure.

- When the topic guide questions are finished, the interviewer will ask for any additional comments the participant would like to give and remind them that all the information given will be kept confidential. These will be recorded by the note taker at the end of the note pad in quote for "Unsolicited reactions".

- Thank the participant and inform him/her that the interview is almost over.

Closing the interview

- Check through the rest of the participant questionnaire and ensure that all portions of the form are filled in properly.

- Thank the participant and ask if he/she has any questions for you about the interview**.**

- Answer any questions that came up during the interview, which you may have deferred to the end.

- Conclude as follows:

"That's all the questions we had for you. Thank you for your patience and co-operation"; we truly appreciate this. We will be in touch should anything come up for which we might need your views on, and we will be available should you need to contact us for any reason related to this interview. Thanks again for every thing, have a good day/good evening."

- Assure them again of your promised confidentiality and give them any additional information necessary, then invite them to leave.

Completing the contact summary

Before departing, or on arrival back at the field base, the interviewer and translator should meet to discuss the findings of the interview. The interviewer should be responsible for completing a contact summary form, with input from the translator.

5.5: CARRYING OUT TEAM DEBRIEFINGS (INTERVIEWS)

I. PURPOSE. To provide research teams with guidance on how to conduct team debriefing meetings following data collection episodes.

II. RATIONALE. We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Record of all IDIs completed in specified period (Enrolment form)
- Record of all Contact Summary forms for IDIs in specified period
- IDI appointment schedule
- Debriefing minutes form
- Notepad
- Clipboard
- Pens

V. DEFINITIONS:

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.

VI. PROCEDURES

A. Arranging debriefing meetings

- The lead investigator in the field should devise a regular schedule of debriefing meetings reflecting the frequency of IDIs being conducted. Debriefing meetings should be held approximately every 4 IDIs, or once a week, whichever is the sooner.
- The debriefing meeting schedule, including time and location of meetings, should be disseminated to all field team members and any revisions that are made should be communicated at the earliest possibility.
- It is the responsibility of all team members to ensure that they are able to attend each debriefing meeting and to provide feedback.
- The lead investigator should ensure that all necessary documents from the specified time period are made available for the debriefing meeting (Enrolment Forms, Contact Summary Forms and IDI appointment schedule), and ideally available beforehand to enable the lead investigator to examine the documents.
- A member of the team should be appointed minute-taker for each debriefing meeting, and be advised on how to capture all the information discussed in the meeting.
- A suitable venue should be arranged for each meeting that is easily accessible for all members of the research team.

B. Conducting debriefing meetings

- The debriefing meetings should be chaired by the lead investigator in the field, and should be guided by the content of the Debriefing Minutes Form.
- A member of the field team designated to take minutes should record the details of the discussion on the Debriefing Minutes Form.
- The discussion in the meetings should address each of the IDIs conducted within the specified time period, with the field researchers inputting on their experiences and thoughts following the IDIs.
- The discussion of each IDI should be in conjunction with examination of the relevant Contact Summary Form and the research team should be encouraged to reflect on their practice in each interview.
- The discussion should also address similarities and differences between interview data, what insights have arisen from the series of IDIs and how these compare to any previous data collected and the theoretical framework of the study.
- More practical issues such as problems with the topic guide, equipment or recruitment should also be addressed here, and any solutions identified should be recorded on the Debriefing Minutes Form and made into recommended action points.
- The discussion should also include the number of upcoming scheduled interviews, and this should be reflected upon in light of the sampling strategy and the emerging themes, for example if data saturation is beginning to occur.

5.6: TRANSCRIPTION

I. PURPOSE. To describe the transcription of audio files of in-depth interviews.

II. RATIONALE. . We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Completed contact summary forms
- Audio files
- Completed enrolment forms
- Completed interview notes

IV. TARGET AUDIENCE

- Research team
- Transcriber/translator

V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **IDI:** in-depth interview
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Preparing documents

- The transcriber/translator will be responsible for transcribing the discussions from the IDIs, recorded onto digital voice recorder.
- After each IDI, the audio file should be uploaded from the voice recorder onto the research team computers and saved as a new file with the appropriate file name according to the file naming protocol.
- Each transcript should be typed into a new Word file directly from the audio file in the original language used during the IDI. The file should be saved using the appropriate file name, the same as the audio file.
- At the top of the transcript document should be the transcript table detailing the facilitator and note-taker names, date of the IDI, language of the interview, venue, date transcript completed, the ID number of the IDI, and the language that the transcript is in. See the example below:

Identification Number (e.g. FGDA03) |__|__|__|__|__|__|__|__|
Interviewer (note-taker) name:
Translator/facilitator name:
Date of FGD: (dd/mm/yyyy)
Language of FGD:
Venue:
Date completed transcript: (dd/mm/yyyy)
Start time of recording
End time of recording
Length of recording

- Immediately after the transcript header table, the contact summary should be inserted prior to the start of the transcript itself.
- Recordings should be transcribed as soon as possible after the interview/group discussion, preferably within 24 hours.

B. Transcription guidelines

- The transcription should be done verbatim (every word captured exactly); all hesitations (umms, mmms, errrs), repetitions and incomplete sentences should be marked.
- Each new speaker should begin on a new line with either 'P' (participant); I 'interviewer' or 'T' (translator) written at the beginning of the line to indicate who is speaking.
- Non-verbal occurrences including pauses (labelled short or long), laughter, exclamations or sounds of surprise, shock, disagreement, agreement should be marked in square brackets, eg [gasp of surprise] or [participant and interviewer laugh]. Any external interruptions should also be recorded in square brackets eg [telephone rings].
- Interruptions by another member of the group should be indicated with a '---' at the point of interruption in the interruptee's speech and the beginning of the interrupter's speech. The interrupter's speech should begin with a lower case letter and be indented into the page. For example:

  Participant 4: I find the thought of taking more medication on top of my ART rather daunting and I'd prefer ---
  Participant 6: --- I don't agree with that, it's no more difficult for me.

- Where more than one person is talking at once, the overlapping parts of speech should be contained within <<....>>. For example

  Participant 3: It's when you go to the clinic and see a new nurse and have to explain your condition <<again to her, when you just want to say 'I have malaria,>> please give me medication, it's nothing to do with my HIV'
  Participant 1: <<absolutely, it's so annoying>>

- Any relevant annotations or observations from the interview notes or contact summary form should be included in the appropriate place in the transcript within {...}. For example:

  {Participants 4 and 5 look at each other and raise their eyebrows in an amused way}

- If there are any words or sentences that are not clear or are inaudible, the transcriber should suggest what they think it is in italics followed by a '?', and surrounded by ~...~, or write the word 'inaudible' in italics and surrounded by ~...~ if necessary. For example:

Participant 9: That's never happened to me, I don't think I'd worry too much if my daughter ~ *got sick*? ~.

- If a comment cannot be attributed to a particular person within the group, it should be labelled UNKNOWN, and where appropriate an estimate of the number of voices should be given, eg UNKNOWN (3 voices):.

C. Checking transcriptions

- Once a transcription has been completed, the transcriber/translator should read through the transcription against the audio file to check for accuracy and completeness.
- The transcript should then be passed onto another member of the field team for checking and for verification of any unclear words or terminology.
- The transcriber/translator along with another member of the field team should then read through the transcript a third time to check whether there are any identifying details, and if so, to remove them or replace them with anonymous terms, for example names should be replaced with participant numbers or general descriptors such as "clinic nurse", and place names should be replaced with a descriptor in "..." such as "local hospital".
- Once transcripts have been checked and refined, they should be translated using the guidance in **SOP 7: Translation of transcripts.**

5.7: Translation of transcripts

I. PURPOSE. To describe the translation of transcripts of focus group discussions with the three sub-groups of participants.

II. RATIONALE. . We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Transcripts of audio files.

IV. TARGET AUDIENCE

- Research team
- Transcriber/translator

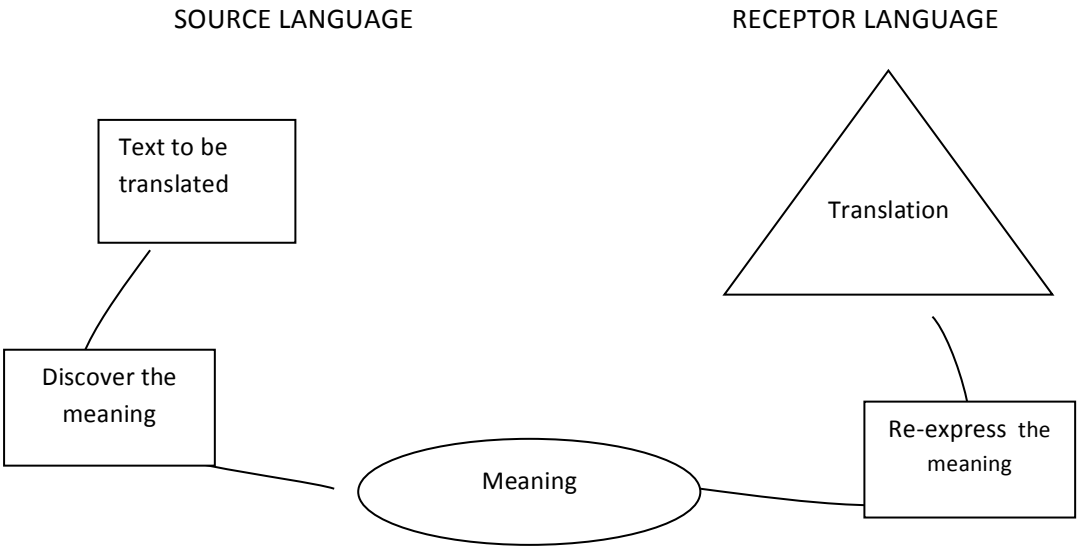
V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **IDI:** in-depth interview
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Translating

- Audio files in Khmer will be transcribed in full on paper and then translated into English by the translator after transcribing has been completed.
- The original text will remain in the document, with the translation made beneath each short section of 4-5 lines. Sections of text will be double-checked for accuracy of translation by the interviewers who conducted the interview.
- For words that can have many meanings depending on the context in which the word is used or said, it is important that the translator writes all the possible meanings of the word/phrase in brackets and then the most appropriate meaning to the phrase that the respondent used is written out of bracket.
- Rather than word-for-word direct translation, or summarization, the translator will conduct meaning-based translation as outlined in the figure below:



B. Checking translations

- The translated script will then be passed to a fluent English speaker who will check each of the scripts for legibility, accuracy and reproducibility.
- The checker will edit the translated transcript document. This can be done on the computer, using the 'track changes' function of Word. All changes on the translated scripts should be made by inserting a change under the 'track changes' function on the computer. Corrections made will bear the initials of the staff member correcting and date of correction.
- Both the final corrected script and the paper copy of the translated script should be filed.
- In the case of any difficult terms, phrases and corrections, the checker and translator will sit together and discuss, such that final and most appropriate translations are agreed upon.
- Translated transcriptions will be saved as new Word files, and labelled with the participant ID number followed by the language that the transcript was translated into (usually English).

5.8: DATA CODING AND ANALYSIS

I. PURPOSE. To describe the process of coding data transcripts and conducting data analysis.

II. RATIONALE. . We plan to conduct in-depth interviews with women, programme implementers and service providers in Kampong Thom province and Phnom Penh in order to explore experiences with and perceptions of voucher and HEF programmes and targeting mechanisms.

III. SUPPLIES AND MATERIALS

- Electronic files of translated transcripts
- NVivo software

IV. TARGET AUDIENCE

- Research team
- PhD supervisors and advisors

V. DEFINITIONS

- **Programme implementer (PI)**: In this SOP, a programme implementer is anyone working for the voucher programme, HEFO or HEFI , either paid staff or voluntary individuals involved in any aspect of implementing these programmes.
- **Service provider (SP):** In this SOP, a service provider is anyone working at a health facility regardless of their salary and training status.
- **Interviewer:** member of the study team carrying out the in-depth interviews.

VI. PROCEDURES

A. Managing quantitative data

- Quantitative data from the IDI enrolment forms will be entered into an Excel spreadsheet, and will be double entered to verify accuracy.
- This data can then be uploaded into a new NVivo file as a casebook and can be linked to all the transcription and audio files.

B. Managing qualitative data

- All data files – the final edited versions of translated transcriptions, as Word documents, typed up contact summary forms, and the audio files – should be imported into a new QSR NVivo 8 workbook, where the files should be saved as 'internals'.
- The new workbook should be saved with the name of the study, the date and the initials of the investigator working on it.

C. Developing initial coding

- Two or three transcripts should be selected at random to be used to develop an initial coding structure. The data analyst should begin to work slowly and carefully through each document, reading line by line to try to interpret the underlying meaning.
- For each line of text/sentence/sub-section of a sentence that carries meaning, the text will be highlighted and used to generate a new 'tree node' in the coding section. The 'tree node' can be labelled either using the *in vivo* text, or with a short description of the meaning or concept represented by the text.
- New 'tree nodes' should be developed for each new idea identified in the text. Repeating ideas can be coded using existing 'tree nodes'. Names of 'tree nodes' can be modified to reflect the content as the coding progresses through the first few transcripts.

- It is important at this stage to generate codes (or 'tree nodes') from small units of empirical text, and to identify as many different ideas or units of meaning as possible.
- As the coding of the initial transcripts develops, tree nodes may be linked together under a new 'parent node' representing a common theme or idea.
- Once the first two or three transcripts have been coded in this way, with tree nodes grouped under parent 'theme' nodes where possible, the data analyst should create a new 'memo' to record what has been coded, and any reflections on that process.

D. Creating a coding template

- The series of parent and tree nodes developed through the initial coding should be saved and if appropriate, shared with other members of the research and supervisory team to discuss the suitability of the codes.
- Following discussion and any revisions to the coding, the coding template will be finalised and saved.
- The coding template will then be used to code the remaining transcripts by the data analyst.

E. Coding

- As coding progresses, new categories, ideas or themes may emerge causing new nodes to be developed, existing ones to be modified or 'parent nodes' to be rearranged. Every time this occurs, the data analyst should create a new memo to describe what is being changed, why and to reflect upon this in light of the whole data analysis process.
- As coding progresses, parent nodes representing themes may be grouped together to represent emerging constructs, which will be labelled.
- Periodically, the coding structure and arrangement should be reviewed and discussed by members of the research and supervisory team. Again, memos should be created to capture these discussions and any subsequent changes.
- Once all the transcripts have been coded, the coding structure, themes and any constructs will be finalised following discussion with the research team.

F. Developing theoretical constructs and narratives

- The fully coded project should be explored for theoretical constructs by the data analyst in conjunction with the research and advisory team. This will include the running of queries, looking at any differences in the concepts emerging according to sub-groups, and different characteristics of participants.
- The data analyst should then develop a narrative bridging the original research concerns with the participants' subjective experiences. The aim of the theoretical narrative will be to retell the participants' stories in terms of the theoretical constructs.
- The findings should be related to wider theory and literature in the topic of interest, documented in the literature review section of the protocol.
- This will involve relating the findings to the original conceptual framework, which may be adjusted or replaced by a new framework based on the evidence from the study. .

G. Drawing conclusions

- The data analyst should present a draft set of findings and conclusions, based on the data analysis and engagement with literature and the conceptual framework.
- This draft should be discussed with the wider research team, indicating where any revisions, clearer narrative links or more detail is required to justify the conclusions.
- Further conclusions or revised conclusions may be made as a result of the discussion.
- The discussion should also address how the conclusions can feed into recommendations to be made.

Following the discussion, the data analyst should revise the draft findings, and write up the conclusions and recommendations.

Appendix 6 Schedule for qualitative research training

Day 1 – Saturday 26th May 2012

9.30-10.00	Introduction and 'what skills do I need?' (Module 1)
10.30-11.00	Break
11.00-12.45	Asking good questions (Module 2)
12.45-13.45	Lunch
13.45-15.00	Awareness and active listening (Module 3)
15.00-15.30	Break
15.30-17.00	Translating in interviews and interview practice (with Chean)

Day 2 – Sunday 27th May 2012

9.30-10.15	Interview seating and introduction (Module 4)
10.15-10.45	Break
10.45-11.45	Doing an interview (Module 4)
11.45-12.15	Note-taking (Module 5)
12.15-13.15	Lunch
13.15-14.30	Note-taking practice (Module 5)
14.30-15.00	Break
15.00-16.00	Contact Summaries and de-briefing meetings (Module 5)
16.00-16.30	Sensitisation for conducting research (Module 6)
16.30-17.00	Invitation and set-up for interviews (Module 7)

Day 3 – Friday 1st June 2012

9.00-10.00	Data management (Module 8)
10.00-10.30	Break
10.30-12.30	Develop SOPs
12.30-13.30	Lunch
13.30-15.00	Develop SOPs

15.00-15.30	Break
15.30-17.00	Develop SOPs

Appendix 7 Study participant information sheet and informed consent form

7.1 Information for Study Participants

Equity of Access to Reproductive and Maternal Health Services in Cambodia: Equity trends, poverty targeting and demand side financing

Background

Reproductive and maternal health services include family planning, antenatal care, delivery care, postpartum care and safe abortion care. The use of these services provided by trained health workers at good quality health facilities is very important to reduce the number of women who die or suffer during pregnancy and childbirth and if we are able to meet their fertility/childbirth preferences. However, well-off and highly-educated women living in urban areas are likely to use such services more than badly-off and poorly-educated ones living in rural areas. Consequently, many schemes have been developed in Cambodia to motivate poor women to use these services as well, for example, by providing free healthcare services to poor women or reimbursing them for transportation to receive the services. Health equity fund and reproductive health service cards are two such schemes that target poor women who visit health facilities in order to receive reproductive and maternal healthcare services.

Research Objective and Method

This research is being carried out by a researcher from the London School of Hygiene and Tropical Health and researchers at the Center for Advanced Study in Phnom Penh. The objective of the study is to measure the difference in the usage of reproductive and maternal healthcare services among groups of women of different living standards, and how it has changed over the last ten years with regard to the gap in the use of services between rich and poor women, i.e. whether the gap is wider or narrower? The study also aims to find out what has led to the difference between groups of rich and poor women, who use or do not use these services, and if the presence of the HEF and cards redeemable for reproductive health service has resulted in the difference in the use of healthcare services among women. This research will entail in-depth discussions. All of these will be conducted at places convenient to interviewees and last one to two hours.

Participation in Interview

You are invited to participate in interviews because we believe that you can contribute to our understanding of peoples' experiences with vouchers and health equity fund program in Kampong Thom province. Participation in all these is completely voluntary. If you agree to be interviewed, you might stop answering questions at all times without having to give any reason. Should you agree to take part, we would like to record the interview and to quote from it in order to facilitate our analysis. Nonetheless, you have the right to point out that you are happy to be interviewed but do not allow for it to be recorded, in which case the interviewer will write notes during interviews.

Confidentiality

If participants are happy for us to identify them, their identification will be shown in our reports and documents to be published. Nevertheless, should you wish to be unidentified, we will also make sure that your identity is not revealed. If you want it like this, we will guarantee that we will not disclose your identity such as information related to where you live, where you work or your position. If you do not want to be quoted from all interviews and be anonymized, we will, with your permission, use the information that you give us to conduct an analysis without mentioning any quotations

or anonymous references. The only persons who can take notes of the interviews will be researchers who are directly involved in the project, i.e. Mrs. Antonia, Mr. Men Chhean Rithy and interview moderator. The interviews will be transcribed by a professional transcriber. The person who quotes will keep it confidential. All interview records will be destroyed and all interview recordings deleted once the project comes to an end.

Please note that we wish to publish the findings of our study and may quote from the interviews, so please think prior to the interviews about whether or not you prefer to be quoted anonymously. You can discuss all these with the interviewer before the interview begins. We can answer your questions and want to clarify your preference.

More Information

Should you have any unanswered questions or need further information or explanation, please contact Mrs. Antonia at the following address:

Center for Advanced Study
160, Street 156, Tuek L'ak II Commune, Tuol Kork District, Phnom Penh City
Tel: 097 7940341
Email: antonia.dingle@lshtm.ac.uk

7.2 Consent Form for Study Participants

Equity of Access to Reproductive and Maternal Health Services in Cambodia:
Equity trends, poverty targeting and demand side financing

Researcher's name and address:
Ms. Antonia Dingle
Email: antonia.dingle@lshtm.ac.uk

Cambodia
Center for Advanced Study
160, Street 156,
Tuek L'ak II Commune, Tuol Kork District,
Phnom Penh City, Cambodia
Tel: 097 7940341

United Kingdom
London School of Hygiene and Tropical Medicine
Faculty of Public Health and Policy
15-17 Tavistock Place
Tel: +44 7872997902

To be completed by study participants

Please tick as appropriate:

1. I have read the information about this study and I understand what will be required of me if I participate in this study [ ]

2. The researcher answered my questions concerning this study [ ]

3. I understand that I might withdraw from this study at any time without having to give any reason [ ]

4. I agree to participate in this study [ ]

5. Please tick one of the following statements:

    a. I give my permission for my interview to be recorded [ ]

    b. I do not give my permission for my interview to be recorded [ ]

6. I agree that my interview may be quoted and I would prefer that my name be kept confidential [ ]

Name: ……..

Signature: ……..

Date: ……..

Appendix 8 Interview de-brief template

Team debriefing session minutes

Date: |__|__|/|__|__|/|__|__|

Present at meeting:

Meeting chair:

Interviews discussed: IDI Nos: |__|__|__|__|__| to |__|__|__|__|__|

Participant sub-group types (*state no.*): Women/HU ____ Women/HN ____
Women/NN ____ Women/RHU ____
Service providers ____ VRHS ____
HEFO/I ____ VRG ____

1. Were all the interviews planned for this period completed? If not, what were the reasons for incompletion?

2. What were the main points made by the respondents during these interviews (keep a tally by each point for number of interviews identifying the same point)?

3. What information or ideas were new in these interviews compared with previous interviews (keep a tally by each point for number of interviews identifying the same point)?

4. Discuss the impact of the findings so far on intervention design and note ideas arising.

5. Going through each domain, are there still new ideas emerging of interest to the study objective? If no, consider whether saturation is complete (this may apply to one or more domain which could be removed from the topic guide for subsequent interviews. Only remove domains or terminate data collection after discussion with the study investigators).

6. Discuss any problems with the topic guides (e.g. wording, order of topics, missing topics) and make changes to the guides.

7. Plans for the next week: targets for data collection, transcription, coding to achieve.

Appendix 9 Coding framework for qualitative data analysis

1. Poverty in Cambodia
   - 1.1. What is it like to be poor?
   - 1.2. Levels of poverty
   - 1.3. Differences between poor and non-poor
     - 1.3.1. Differences in assets and possessions
     - 1.3.2. Differences in health and use of healthcare – health inequities
   - 1.4. Relationship between poor and non-poor
   - 1.5. Overcoming poverty/dynamic nature of poverty and wealth
   - 1.6. Other

2. The ID Poor system
   - 2.1. Perspectives of ID Poor
     - 2.1.1. Perspectives +
     - 2.1.2. Perspectives –
   - 2.2. Accuracy of ID Poor
     - 2.2.1. Inclusion errors
     - 2.2.2. Exclusion errors
   - 2.3. Challenges implementing ID Poor
   - 2.4. Suggested improvements to ID Poor
   - 2.5. Other

3. Trends in use of reproductive and maternal health (RMH) services
   - 3.1. Use today – family planning
   - 3.2. Use for previous generations or children - changes – family planning
   - 3.3. Use today – maternal health
   - 3.4. Use for previous generations or children – changes – maternal health
   - 3.5. Reasons for change in use
   - 3.6. Decision making for RMH
   - 3.7. Socio-political cultural factors linked to service use
   - 3.8. Distal factors linked to service use
   - 3.9. Proximate factors linked to service use
   - 3.10. Trends other

4. Users of the Vouchers for Reproductive Health Services (VRHS) project
   - 4.1. Perspectives of VRHS
   - 4.2. Experiences with the vouchers
     - 4.2.1. Voucher experience +
     - 4.2.2. Voucher experience –
   - 4.3. Reasons for using vouchers
   - 4.4. Reasons for not using vouchers
   - 4.5. Barriers to access overcome by voucher
   - 4.6. Barriers to access which remain with voucher
   - 4.7. Impact of the voucher for users
   - 4.8. Recommendations for future of VRHS (users)
   - 4.9. Other

5. Implementers of the Vouchers for Reproductive Health Services (VRHS) project
   - 5.1. Experiences of VRHS staff

- 5.1.1.Staff experience +
- 5.1.2.Staff experience –

5.2. Experiences of health centre staff with VRHS

- 5.2.1.HC staff experience +
- 5.2.2.HC staff experience –

5.3. Challenges implementing VRHS

5.4. Recommendations for future of VRHS (implementers)

5.5. Other

6. Complementarities between VRHS and other social health protection mechanisms
   - 6.1. VRHS and HEFs
   - 6.2. VRHS and CBHI
   - 6.3. VRHS and other
   - 6.4. Other

7. Quality of health services
   - 7.1. Quality at health centre (village) level
   - 7.2. Quality at provincial hospital level

Appendix 10a-c Equity analysis for reproductive and maternal health services in Cambodia, 2000-2010, using multiple social stratification variables

Table A10a: Equity in reproductive and maternal health services Cambodia, 2000, measured by multiple social stratification variables							
Service	**Overall % service use**	**Social stratification variable**		**% Service use**	**Equity gap (Q5-Q1/most ed-least ed, % points)**	**Equity ratio§**	**Indirectly standardised concentration index (95% CI)**
4+ Antenatal care	9.01%	Household assets	Q1 (poorest)	2.22%	19.25%	9.67	0.43
			Q2	5.40%			
			Q3	5.28%			(0.16 , 0.70)
			Q4	6.05%			
			Q5 (richest)	21.47%			
		Education	0-3 years	4.10%	47.98%	12.70	0.42
			4-6 years	6.96%			
			7-9 years	19.20%			(0.39 , 0.45)
			10-12 years	19.46%			
			13+ years	52.08%			
Skilled birth attendance	32.21%	Household assets	Q1 (poorest)	14.31%	51.84%	4.62	0.33
			Q2	16.88%			
			Q3	22.83%			(0.29 , 0.37)
			Q4	29.48%			
			Q5 (richest)	66.15%			
		Education	0-3 years	18.25%	68.85%	4.77	0.26
			4-6 years	30.92%			
			7-9 years	53.74%			(0.21 , 0.31)
			10-12 years	74.13%			
			13+ years	87.10%			
Facility-based delivery	10.04%	Household assets	Q1 (poorest)	1.82%	27.39%	16.05	0.58
			Q2	3.00%			
			Q3	3.88%			(0.52 , 0.64)
			Q4	6.43%			
			Q5 (richest)	29.21%			
		Education	0-3 years	3.66%	54.40%	15.86	0.43
			4-6 years	7.97%			

			7-9 years	18.66%			(0.36 , 0.50)
			10-12 years	41.15%			
			13+ years	58.06%			
Postnatal care	54.62%	Household assets	Q1 (poorest)	40.89%	29.64%	1.72	0.10
			Q2	45.31%			
			Q3	46.56%			(0.08 , 0.12)
			Q4	49.62%			
			Q5 (richest)	70.53%			
		Education	0-3 years	45.42%	38.45%	1.85	0.09
			4-6 years	49.92%			
			7-9 years	60.68%			(0.07 , 0.11)
			10-12 years	79.15%			
			13+ years	83.87%			
Met need for family planning	24.41%	Household assets	Q1 (poorest)	12.25%	24.39%	2.99	0.21
			Q2	17.97%			
			Q3	23.33%			(0.18 , 0.24)
			Q4	24.70%			
			Q5 (richest)	36.64%			
		Education	0-3 years	18.08%	19.81%	2.10	0.12
			4-6 years	23.69%			
			7-9 years	28.99%			(0.09 , 0.15)
			10-12 years	39.75%			
			13+ years	37.89%			
Abortion by skilled provider	81.88%	Household assets	Q1 (poorest)	58.62%	39.11%	1.67	0.10
			Q2	79.25%			
			Q3	75.56%			(0.06 , 0.14)
			Q4	88.33%			
			Q5 (richest)	97.73%			
		Education	0-3 years	67.80%	32.20%	1.47	0.07
			4-6 years	86.81%			
			7-9 years	89.19%			(0.03 , 0.11)
			10-12 years	100.00 %			
			13+ years	100.00 %			
§ Calculated as proportion of serivce use in richest wealth quintile/most educated group divided by proportion of service use in poorest quintile/least educated group							

Table A10b: Equity in reproductive and maternal health services Cambodia, 2005, measured by multiple social stratification variables							
Service	**Overall % service use**	**Social stratification variable**		**% Service use**	**Equity gap (Q5-Q1/most ed-least ed, % points)**	**Equity ratio§**	**Indirectly standardised concentration index (95% CI)**
4+ Antenatal care	26.98 %	Household assets	Q1 (poorest)	13.78%	37.64%	3.73	0.28
			Q2	15.58%			
			Q3	19.85%			(0.25 , 0.31)
			Q4	27.65%			
			Q5 (richest)	51.42%			
		Education	0-3 years	14.45%	64.96%	5.50	0.26
			4-6 years	25.88%			
			7-9 years	39.94%			(0.23 , 0.29)
			10-12 years	55.17%			
			13+ years	79.41%			
Skilled birth attendance	43.76 %	Household assets	Q1 (poorest)	14.36%	72.40%	6.04	0.35
			Q2	23.05%			
			Q3	28.68%			(0.30 , 0.40)
			Q4	45.51%			
			Q5 (richest)	86.76%			
		Education	0-3 years	21.16%	72.44%	4.42	0.29
			4-6 years	42.12%			
			7-9 years	67.13%			(0.26 , 0.32)
			10-12 years	81.69%			
			13+ years	93.60%			
Facility-based delivery	21.18 %	Household assets	Q1 (poorest)	5.24%	51.55%	10.84	0.50
			Q2	6.78%			
			Q3	10.44%			(0.43 , 0.57)
			Q4	16.62%			
			Q5 (richest)	56.79%			
		Education	0-3 years	8.45%	65.95%	8.80	0.38
			4-6 years	18.02%			
			7-9 years	35.09%			(0.33 , 0.43)
			10-12 years	50.17%			

			13+ years	74.40%			
Postnatal care	69.87 %	Household assets	Q1 (poorest)	53.98%	31.93%	1.59	0.09
			Q2	62.82%			
			Q3	66.31%			(0.07 , 0.11)
			Q4	73.61%			
			Q5 (richest)	85.91%			
		Education	0-3 years	61.24%	34.84%	1.57	0.06
			4-6 years	68.41%			
			7-9 years	79.21%			(0.04 , 0.08)
			10-12 years	85.34%			
			13+ years	96.08%			
Met need for family planning	40.42 %	Household assets	Q1 (poorest)	30.65%	24.10%	1.79	0.11
			Q2	35.77%			
			Q3	36.64%			(0.09 , 0.13)
			Q4	41.93%			
			Q5 (richest)	54.75%			
		Education	0-3 years	32.34%	22.00%	1.68	0.11
			4-6 years	42.53%			
			7-9 years	48.41%			(0.09 , 0.13)
			10-12 years	54.18%			
			13+ years	54.34%			
Abortion by skilled provider	78.36 %	Household assets	Q1 (poorest)	58.12%	31.35%	1.54	0.07
			Q2	75.38%			
			Q3	74.44%			(0.04 , 0.10)
			Q4	84.33%			
			Q5 (richest)	89.47%			
		Education	0-3 years	69.36%	16.35%	1.24	0.06
			4-6 years	77.00%			
			7-9 years	79.31%			(0.03 , 0.09)
			10-12 years	97.22%			
			13+ years	85.71%			
§ Calculated as proportion of service use in richest wealth quintile/most educated group divided by proportion of service use in poorest quintile/least educated group							

Table A10c: Equity in reproductive and maternal health services Cambodia, 2010, measured by multiple socio-economic status variables							
Service	**Overall % service use**	**Social stratification variable**		**% Service use**	**Equity gap (Q5-Q1/most ed-least ed, % points)**	**Equity ratio§**	**Indirectly standardised concentration index (95% CI)**
4+ Antenatal care	57.27%	Household assets	Q1 (poorest)	37.37%	42.10%	2.13	0.15
			Q2	45.62%			(0.13 , 0.17)
			Q3	52.73%			
			Q4	63.25%			
			Q5 (richest)	79.47%			
		Education	0-3 years	38.28%	51.76%	2.35	0.15
			4-6 years	57.26%			(0.13 , 0.17)
			7-9 years	70.48%			
			10-12 years	79.03%			
			13+ years	90.04%			
Skilled birth attendance	68.81%	Household assets	Q1 (poorest)	42.23%	54.57%	2.29	0.17
			Q2	53.42%			(0.15 , 0.19)
			Q3	62.95%			
			Q4	79.32%			
			Q5 (richest)	96.80%			
		Education	0-3 years	47.75%	51.05%	2.07	0.11
			4-6 years	70.61%			(0.09 , 0.11)
			7-9 years	85.10%			
			10-12 years	95.43%			
			13+ years	98.80%			
Facility-based delivery	53.07%	Household assets	Q1 (poorest)	29.16%	53.69%	2.84	0.22
			Q2	37.34%			(0.20 , 0.24)
			Q3	43.98%			
			Q4	57.73%			
			Q5 (richest)	82.85%			
		Education	0-3 years	33.94%	56.15%	2.65	0.19
			4-6 years	51.69%			(0.16 , 0.21)
			7-9 years	65.74%			
			10-12 years	78.50%			
			13+ years	90.09%			
Postnatal care	73.84%	Household assets	Q1 (poorest)	51.81%	38.36%	1.74	0.12
			Q2	55.83%			

			Q3	59.78%			(0.10 , 0.14)
			Q4	73.83%			
			Q5 (richest)	90.17%			
		Education	0-3 years	50.40%	44.65%	1.89	0.12
			4-6 years	69.60%			
			7-9 years	79.06%			(0.10 , 0.14)
			10-12 years	87.14%			
			13+ years	95.05%			
Met need for family planning	50.96%	Household assets	Q1 (poorest)	41.60%	13.80%	1.33	0.06
			Q2	46.75%			
			Q3	51.29%			(0.05 , 0.07)
			Q4	51.03%			
			Q5 (richest)	55.40%			
		Education	0-3 years	42.12%	13.93%	1.33	0.06
			4-6 years	49.94%			
			7-9 years	54.68%			(0.05 , 0.07)
			10-12 years	57.57%			
			13+ years	56.05%			
Abortion by skilled provider	84.48% *	Household assets	Q1 (poorest)	77.26%	6.43%	1.08	0.01
			Q2	79.64%			
			Q3	84.84%			(-0.02 ,0.04)
			Q4	85.65%			
			Q5 (richest)	83.69%			
		Education	0-3 years	78.55%	6.64%	1.08	0.03
			4-6 years	83.64%			
			7-9 years	88.58%			(0.00 , 0.06)
			10-12 years	84.72%			
			13+ years	85.19%			

§ Calculated as proportion of service use in richest wealth quintile/most educated group divided by proportion of service use in poorest quintile/least educated group

* Excludes all women who report having a medical abortion, which can be administered at home

Appendix 11a-b Equity in use of reproductive and maternal health services in Cambodia, 2005 and 2010, by common and maximum households assets

Appendix A11a: Equity in use of reproductive and maternal health services in Cambodia by common and maximum household assets, 2005										
Service	**Overall % service use**		**% Service use by wealth quintile (max assets)**	**% Service use by wealth quintile (common assets)**	**Equity gap (Q5-Q1, % points) (max assets)**	**Equity gap (Q5-Q1, % points) (common assets)**	**Equity ratio (max assets) §**	**Equity ratio (common assets) §**	**Indirectly standardised concentration index (max assets)**	**Indirectly standardised concentration index (common assets)**
4+ Antenatal care	26.98%	Q1 (poorest)	13.78%	12.57%	37.64%	38.96%	3.73	4.10	0.28	0.29
		Q2	15.58%	16.11%						
		Q3	19.85%	20.99%					(0.25 , 0.31)	(0.26 , 0.32)
		Q4	27.65%	27.81%						
		Q5 (richest)	51.42%	51.53%						
Skilled birth attendance	43.76%	Q1 (poorest)	14.36%	14.64%	72.40%	72.41%	6.04	5.95	0.35	0.35
		Q2	23.05%	22.67%						
		Q3	28.68%	30.62%					(0.30 , 0.40)	(0.30 , 0.40)

		Q4	45.51%	45.05%						
		Q5 (richest)	86.76%	87.05%						
Facility based delivery	21.18%	Q1 (poorest)	5.24%	5.47%	51.55%	51.42%	10.84	10.40	0.5	0.46
		Q2	6.78%	7.23%						
		Q3	10.44%	10.83%					(0.43 , 0.57)	(0.40 , 0.52)
		Q4	16.62%	16.34%						
		Q5 (richest)	56.79%	56.89%						
Postnatal care	67.57%	Q1 (poorest)	53.98%	55.64%	31.93%	30.52%	1.59	1.55	0.09	0.09
		Q2	62.82%	63.54%						
		Q3	66.31%	65.55%					(0.07 , 0.11)	(0.07 , 0.11)
		Q4	73.61%	72.09%						
		Q5 (richest)	85.91%	86.16%						
Met need for family planning	40.42%	Q1 (poorest)	30.65%	29.32%	24.10%	25.18%	1.79	1.86	0.11	0.12
		Q2	35.77%	35.20%						
		Q3	36.64%	38.77%					(0.09 , 0.13)	(0.10 , 0.14)
		Q4	41.93%	42.41%						
		Q5 (richest)	54.75%	54.50%						
Abortion	78.36%	Q1	58.12%	62.30%	31.35%	27.70%	1.54	1.44	0.07	0.07

with a skilled provider		(poorest)								
		Q2	75.38%	73.17%						
		Q3	74.44%	71.74%					(0.04 , 0.10)	(0.04 , 0.10)
		Q4	84.33%	85.38%						
		Q5 (richest)	89.47%	90.00%						
§ Calculated as proportion of service use in richest wealth quintile divided by proportion of service use in poorest quintile										

Appendix A11b: Equity in use of reproductive and maternal health services in Cambodia by common and maximum household assets, 2010										
Service	**Overall % service use**		**% Service use stratified by SES (max assets)**	**% Service use stratified by SES (common assets)**	**Equity gap (Q5-Q1, % points) (max assets)**	**Equity gap (Q5-Q1, % points) (common assets)**	**Equity ratio (max assets) §**	**Equity ratio (common assets) §**	**Indirectly standardised concentration index (max assets)**	**Indirectly standardised concentration index (common assets)**
4+ Antenatal care	57.27%	Q1 (poorest)	37.37%	35.58%	42.10%	44.05%	2.13	2.24	0.15	0.16
		Q2	45.62%	46.01%						
		Q3	52.73%	51.60%					(0.13 , 0.17)	(0.14 , 0.18)
		Q4	63.25%	66.91%						
		Q5 (richest)	79.47%	79.63%						
Skilled birth attendance	68.81%	Q1 (poorest)	42.23%	42.16%	54.57%	54.72%	2.29	2.30	0.17	0.17
		Q2	53.42%	51.92%						
		Q3	62.95%	64.29%					(0.15 , 0.19)	(0.15 , 0.19)
		Q4	79.32%	81.20%						
		Q5 (richest)	96.80%	96.88%						
Facility based delivery	53.07%	Q1 (poorest)	29.16%	30.21%	53.69%	52.36%	2.84	2.73	0.22	0.22
		Q2	37.34%	34.48%						

		Q3	43.98%	44.94%						
		Q4	57.73%	60.08%					(0.20 , 0.24)	(0.20 , 0.24)
		Q5 (richest)	82.85%	82.57%						
Postnatal care	73.84%	Q1 (poorest)	51.81%	49.45%	38.36%	40.88%	1.74	1.83	0.12	0.13
		Q2	55.83%	54.25%						
		Q3	59.78%	63.23%					(0.10 , 0.14)	(0.11 , 0.15)
		Q4	73.83%	75.64%						
		Q5 (richest)	90.17%	90.33%						
Met need for family planning	50.96%	Q1 (poorest)	41.60%	39.95%	13.80%	15.34%	1.33	1.38	0.06	0.06
		Q2	46.75%	49.02%						
		Q3	51.29%	48.94%					(0.05 , 0.07)	(0.05 , 0.07)
		Q4	51.03%	52.04%						
		Q5 (richest)	55.40%	55.29%						
Abortion with a skilled provider	84.48%*	Q1 (poorest)	77.26%	76.90%	6.43%	6.09%	1.08	1.08	0.01	0.01
		Q2	79.64%	80.06%						
		Q3	84.84%	85.95%					(-0.02 ,0.04)	(-0.02 , 0.04)

		Q4	85.65%	86.56%						
		Q5 (richest)	83.69%	82.99%						
§ Calculated as proportion of service use in richest wealth quintile divided by proportion of service use in poorest quintile * Excludes all women who report having a medical abortion, which can be administered at home										

Appendix 12a-f Descriptive statistics of women by service use, Cambodia, DHS 2000-2010

Appendix A12a: Descriptive statistics, women using antenatal care, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	31.15	6.98	30.13	7.18	29.32	6.60
Age at delivery (years)	29.57	6.75	28.52	6.9	27.63	6.31
Age at first marriage (years)	19.31	3.76	19.46	3.78	19.74	3.66
Parity (births)	3.89	2.49	3.23	2.21	2.68	1.84
Household size (people)	6.11	2.20	5.70	2.22	5.60	2.15
Urban residence	0.14	0.34	0.14	0.35	0.16	0.37
Highest level of education						
No education	0.32	0.47	0.23	0.42	0.17	0.38
Primary	0.54	0.50	0.59	0.49	0.56	0.50
Secondary	0.14	0.35	0.17	0.38	0.25	0.43
Higher	0.002	0.04	0.01	0.07	0.02	0.13
Religion						
Buddhist	0.96	0.19	0.97	0.18	0.97	0.18
Muslim	0.02	0.15	0.02	0.13	0.02	0.13
Christian	0.002	0.05	0.004	0.07	0.00	0.06
Other	0.01	0.12	0.01	0.11	0.01	0.11
Marital status						
Never married	0	0	0.00	0.02	0.00	0.02
Living together	-	-	0.003	0.06	0.01	0.08
Married	0.94	0.24	0.94	0.23	0.95	0.22
Widowed	0.04	0.19	0.03	0.18	0.02	0.19
Divorced	0.02	0.14	0.03	0.18	0.04	0.23
Not living together	0.01	0.08	0.02	0.16	0.02	0.17
Husband's occupation						
Did not work	0.02	0.16	-	-	0.00	0.06

Professional/technician/manager	0.07	0.26	0.04	0.21	0.08	0.26
Clerical	0.01	0.09	0.02	0.14	0.01	0.12
Sales	0.04	0.19	0.06	0.24	0.06	0.23
Agricultural self-employed	-	-	0.50	0.50	0.54	0.50
Agricultural employee	0.71	0.45	0.12	0.32	-	-
Services	0.01	0.11	0.05	0.21	0.05	0.22
Skilled manual	0.09	0.29	0.12	0.32	0.25	0.43
Unskilled manual	0.04	0.20	0.09	0.29	0.01	0.09
At least 4 ANC visits during pregnancy	0.09	0.29	0.27	0.44	0.60	0.49
N (2000) = 6049; N (2005) = 6075; N (2010) = 6371						

Appendix A12b: Descriptive statistics, women with skilled birth attendance at delivery, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	31.03	6.74	29.92	6.96	29.22	6.41
Age at delivery (years)	28.98	6.64	27.94	6.81	27.22	6.22
Age at first marriage (years)	19.44	3.74	19.42	3.74	19.71	3.67
Parity (births)	4.1	2.49	3.38	2.20	2.84	1.88
Household size (people)	6.17	2.18	5.80	2.23	5.67	2.18
Urban residence	0.13	0.34	0.14	0.35	0.16	0.36
Highest level of education						
No education	0.33	0.47	0.24	0.43	0.18	0.39
Primary	0.54	0.5	0.59	0.49	0.57	0.50
Secondary	0.14	0.34	0.16	0.37	0.23	0.42
Higher	0.002	0.04	0.01	0.07	0.02	0.12
Religion						
Buddhist	0.96	0.19	0.96	0.19	0.97	0.18
Muslim	0.02	0.14	0.02	0.13	0.05	0.12
Christian	0.002	0.05	0.004	0.07	0.00	0.06
Other	0.02	0.12	0.01	0.12	0.01	0.12
Marital status						
Never married	0	0	0.001	0.02	0.00	0.02
Living together	-	-	0.004	0.06	0.01	0.08
Married	0.95	0.22	0.95	0.22	0.95	0.21
Widowed	0.03	0.17	0.02	0.18	0.02	0.19
Divorced	0.02	0.13	0.03	0.18	0.04	0.23
Not living together	0.01	0.08	0.02	0.16	0.02	0.17
Husband's occupation						
Did not work	0.02	0.16	-	-	0.00	0.06
Professional/technician/manager	0.07	0.25	0.04	0.20	0.07	0.26
Clerical	0.01	0.09	0.02	0.14	0.01	0.11
Sales	0.04	0.19	0.06	0.24	0.06	0.23

Agricultural self-employed	-	-	0.50	0.50	0.55	0.50
Agricultural employee	0.72	0.45	0.12	0.33	-	-
Services	0.01	0.11	0.04	0.21	0.05	0.22
Skilled manual	0.09	0.28	0.12	0.32	0.25	0.43
Unskilled manual	0.04	0.19	0.09	0.29	0.01	0.09
Skilled birth attendance during delivery	0.32	0.47	0.44	0.50	0.71	0.45
N (2000) = 8729; N (2005) = 8201; N (2010) = 8115						

Appendix A12c: Descriptive statistics, women with facility based delivery, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	31.03	6.74	29.92	6.96	29.22	6.41
Age at delivery (years)	28.98	6.64	29.88	6.94	27.22	6.22
Age at first marriage (years)	19.43	3.74	19.42	3.74	19.65	3.72
Parity (births)	4.11	2.49	3.38	2.20	2.84	1.88
Household size (people)	6.17	2.18	5.80	2.23	5.68	2.18
Urban residence	0.13	0.34	0.14	0.35	0.16	0.36
Highest level of education						
No education	0.33	0.47	0.24	0.43	0.18	0.39
Primary	0.53	0.50	0.59	0.49	0.56	0.50
Secondary	0.13	0.34	0.16	0.37	0.23	0.42
Higher	0.00	0.04	0.01	0.07	0.01	0.12
Religion						
Buddhist	0.96	0.19	0.96	0.19	0.97	0.18
Muslim	0.02	0.14	0.02	0.13	0.01	0.12
Christian	0.00	0.05	0.00	0.07	0.00	0.06
Other	0.02	0.12	0.14	0.12	0.01	0.12
Marital status						
Never married	0.00	0.00	0.00	0.02	0.00	0.02
Living together	-	-	0.00	0.06	0.01	0.08
Married	0.95	0.22	0.95	0.22	0.95	0.21
Widowed	0.03	0.17	0.02	0.18	0.02	0.19
Divorced	0.02	0.13	0.03	0.18	0.04	0.23
Not living together	0.01	0.08	0.02	0.16	0.02	0.17
Husband's occupation						
Did not work	0.02	0.16	-	-	0.00	0.06
Professional/technician/manager	0.07	0.25	0.04	0.20	0.07	0.26
Clerical	0.01	0.09	0.02	0.14	0.01	0.11
Sales	0.04	0.19	0.06	0.24	0.05	0.23
Agricultural self-employed	-	-	0.50	0.50	0.55	0.50

Agricultural employee	0.72	0.45	0.12	0.33	-	-
Services	0.01	0.11	0.04	0.21	0.05	0.22
Skilled manual	0.09	0.28	0.12	0.32	0.25	0.43
Unskilled manual	0.04	0.19	0.09	0.29	0.01	0.09
Facility based delivery	0.10	0.30	0.21	0.41	0.53	0.50
N (2000) = 8746; N (2005) = 8201; N (2010) = 8138						

Appendix A12d: Descriptive statistics, women receiving postnatal care, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	31.03	6.75	30.13	7.18	29.34	6.61
Age at delivery (years)	28.98	6.64	28.52	6.90	27.64	6.32
Age at first marriage (years)	19.43	3.74	19.46	3.78	19.74	3.66
Parity (births)	4.11	2.49	3.23	2.21	12.69	1.84
Household size (people)	6.17	2.18	5.70	2.22	5.60	2.15
Urban residence	0.13	0.34	0.14	0.35	0.16	0.37
Highest level of education						
No education	0.33	0.47	0.23	0.42	0.17	0.38
Primary	0.53	0.50	0.59	0.49	0.56	0.50
Secondary	0.13	0.34	0.17	0.38	0.25	0.43
Higher	0.00	0.04	0.01	0.07	0.02	0.13
Religion						
Buddhist	0.96	0.19	0.97	0.18	0.97	0.18
Muslim	0.02	0.14	0.02	0.13	0.02	0.13
Christian	0.00	0.05	0.0	0.07	0.00	0.06
Other	0.02	0.12	0.01	0.11	0.01	0.11
Marital status						
Never married	0.00	0.00	0.00	0.02	0.00	0.02
Living together	-	-	0.00	0.06	0.01	0.08
Married	0.95	0.22	0.94	0.23	0.95	0.22
Widowed	0.03	0.17	0.03	0.18	0.02	0.19
Divorced	0.02	0.13	0.03	0.18	0.04	0.23
Not living together	0.01	0.08	0.02	0.16	0.02	0.17
Husband's occupation						
Did not work	0.02	0.16	-	-	0.00	0.06
Professional/technician/manager	0.07	0.25	0.04	0.21	0.08	0.26
Clerical	0.01	0.09	0.02	0.14	0.01	0.12
Sales	0.04	0.19	0.06	0.24	0.06	0.23
Agricultural self-employed	-	-	0.5	0.5	0.54	0.50

Agricultural employee	0.72	0.45	0.12	0.32	-	-
Services	0.01	0.11	0.05	0.21	0.05	0.22
Skilled manual	0.09	0.28	0.12	0.32	0.25	0.43
Unskilled manual	0.04	0.19	0.09	0.29	0.01	0.09
Postnatal care visit after delivery	0.55	0.50	0.70	0.46	0.74	0.44
N (2000) = 8737; N (2005) = 6076; N (2010) = 6374						

Appendix A12e: Descriptive statistics, currently married women, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	33.5	8.32	33.6	8.69	33.34	8.66
Age at first marriage (years)	19.27	3.8	19.47	3.75	19.67	3.79
Household size (people)	6.05	2.16	5.67	2.19	5.46	2.08
Urban residence	0.16	0.36	0.15	0.36	1.82	0.38
Highest level of education						
No education	0.35	0.48	0.23	0.42	0.19	0.39
Primary	0.53	0.50	0.59	0.49	0.56	0.50
Secondary	0.12	0.33	0.17	0.38	0.24	0.43
Higher	0.002	0.04	0.01	0.08	0.01	0.12
Religion						
Buddhist	0.92	0.26	0.97	0.17	0.97	0.16
Muslim	0.02	0.15	0.02	0.13	0.01	0.12
Christian	0.002	0.05	0.00	0.06	0.00	0.06
Other	0.05	0.22	0.01	0.10	0.01	0.10
Husband's occupation						
Did not work	0.02	0.15	-	-	0.01	0.09
Professional/technician/manager	0.10	0.30	0.06	0.24	0.08	0.28
Clerical	0.01	0.10	0.02	0.15	0.02	0.12
Sales	0.04	0.20	0.07	0.25	0.06	0.24
Agricultural self-employed	-	-	0.49	0.50	0.55	0.50
Agricultural employee	0.70	0.46	0.11	0.32	-	-
Services	0.01	0.1	0.05	0.22	0.06	0.24
Skilled manual	0.09	0.28	0.11	0.31	0.22	0.41
Unskilled manual	0.03	0.18	0.08	0.27	0.01	0.09
Met neet for family planning	0.24	0.43	0.40	0.49	0.51	0.50
N (2000) = 9306; N (2005) = 10164; N (2010) = 11439						

Appendix A12f: Descriptive statistics, women reporting an abortion, Cambodia, DHS 2000-2010						
Year	**2000**		**2005**		**2010**	
Variable	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age (years)	34.84	6.83	32.62	7.16	36.25	7.07
Age at first marriage (years)	19.56	3.97	19.07	3.8	18.94	3.54
Household size (people)	6.08	2.01	5.62	2.46	5.60	2.01
Urban residence	0.20	0.40	0.25	0.44	0.2	0.4
Highest level of education						
No education	0.27	0.45	0.21	0.41	0.18	0.39
Primary	0.60	0.49	0.58	0.49	0.67	0.47
Secondary	0.13	0.33	0.21	0.41	0.15	0.35
Higher	0.00	0.00	0.00	0.06	0.00	0.06
Religion						
Buddhist	0.97	0.15	0.99	0.12	0.99	0.10
Muslim	0.02	0.13	0.01	0.08	0.01	0.09
Christian	0.01	0.08	0.01	0.09	0.00	0.02
Other	0.00	0.04	0.00	0.00	0.00	0.02
Marital status						
Never married	0.00	0.00	0.00	0.00	0.00	0.00
Living together	-	-	0.01	0.12	0.97	0.18
Married	0.95	0.21	0.94	0.25	0.01	0.08
Widowed	0.02	0.15	0.04	0.26	0.02	0.18
Divorced	0.02	0.15	0.04	0.26	0.03	0.20
Not living together	0.00	0.00	0.06	0.29	0.01	0.15
Husband's occupation						
Did not work	0.03	0.18	-	-	0.01	0.08
Professional/technician/ manager	0.15	0.36	0.07	0.25	0.05	0.21
Clerical	0.00	0.07	0.05	0.21	0.01	0.12
Sales	0.08	0.27	0.06	0.23	0.05	0.21
Agricultural self-employed	-	-	0.34	0.47	0.51	0.50
Agricultural employee	0.47	0.50	0.11	0.31	-	-
Services	0.02	0.15	0.12	0.33	0.08	0.26

Skilled manual	0.16	0.37	0.17	0.37	0.29	0.45
Unskilled manual	0.09	0.28	0.09	0.28	0.01	0.11
Abortion with skilled provider	0.82	0.39	0.78	0.41	0.84	0.36
N (2000) = 261; N (2005) = 617; N (2010) = 2101						

Appendix 13 Testing for divergence in outcomes for non-eligible households in HEF and non-HEF districts

Financial protection outcomes	N	Coefficient	Standard error	P-value
Total expenditure at any health provider in last 30 days, if ill (USD)	1950	-1.560	1.668	0.35
Probability of zero expenditure at any health provider if ill in last 30 days	1950	0.000	0.002	0.95
Probability of zero expenditure at a public health provider if ill in last 30 days	538	0.000	0.002	0.97
Probability of out of pocket health expenditure exceeding 90th centile of spending amongst uninsured, if ill	6863	-0.001	0.001	0.17
Probability of selling assets and borrowing loans with interest to cope with healthcare costs	7427	-0.002	0.001	0.22
Healthcare utilisation outcomes				
Public health provider sought if ill in last 30 days	1951	0.003	0.005	0.52
Public health provider sought if seriously ill in last 30 days	334	0.025	0.018	0.16
Private health provider sought if ill in last 30 days	1951	0.000	0.007	0.978
Public hospital sought if seriously ill in last 30 days	334	0.019	0.020	0.35
4 plus ANC visits during most recent pregnancy	1722	0.007	0.006	0.21
Institutional delivery for most recent pregnancy	2139	0.003	0.008	0.71
Healthcare status outcomes				
Wasting of children under 5 years	988	0.002	0.009	0.80
Wasting of children under 5 years, z score	988	-0.02	0.032	0.53
Stunting of children under 5 years	988	-0.014	0.013	0.29
Stunting of children under 5 years, z score	988	0.002	0.042	0.97
Underweight of children under 5 years	988	0.002	0.012	0.87
Underweight of children under 5 years, z score	988	-0.017	0.027	0.52
Haemoglobin level of children under 5 years, g/dl	1103	-0.262	1.697	0.88
Anaemia status of children under 5 years	1093	-0.009	0.016	0.58
Haemoglobin level of women 15-49 years, g/dl	2874	-0.314	0.199	0.12
Anaemia in women 15-49 years	2876	0.010	0.007	0.15

Appendix 14 Results for financial protection outcomes including all outliers

Financial protection outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
Total expenditure for first visit to any health provider in last 30 days, if ill, per individual (USD)	4244	41.57	24.51	-17.06	33.67	22.82	-10.85	-6.22	-7.35
								(-32.02 , 19.58)	(-28.09 , 13.40)
Free total cost for first visit to any health provider if ill in last 30 days, per individual (USD)	4244	0.01	0.05	0.04	0.01	0.01	0.00	0.04	0.04
								(0.02 , 0.06)	(0.01 , 0.07)
Free total cost for first visit to a public health provider if ill in last 30 days, per individual (USD)	1277	0.02	0.12	0.10	0.01	0.04	0.03	0.08	0.09
								(0.02 , 0.13)	(0.02 , 0.16)

Appendix 15 Results of difference in differences analysis using a poverty score threshold of <10 for non-eligible households and >22 for eligible households

Financial protection outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
Total expenditure at any health provider in last 30 days, if ill (USD)	2951	49.40	20.38	-29.02	40.33	25.79	-14.54	-14.48 (-48.71 , 19.76)	-24.36 (-41.68 , -7.03)
Probability of zero expenditure at any health provider if ill in last 30 days	2951	0.01	0.05	0.04	0.01	0.01	0.00	0.04 (0.02 , 0.07)	0.04 (0.01 , 0.06)
Probability of zero expenditure at a public health provider if ill in last 30 days	1277	0.02	0.12	0.10	0.01	0.04	0.02	0.078 (0.02 , 0.13)	0.087 (0.02 , 0.16)
Probability of out of pocket health expenditure exceeding 90th centile of spending amongst uninsured, if ill	4244	0.11	0.06	-0.05	0.08	0.05	-0.03	-0.026 (-0.07 , 0.01)	-0.04 (-0.08 , -0.004)
Probability of selling assets and	4252	0.18	0.17	-0.01	0.11	0.15	0.04	-0.056 (-0.12 , 0.01)	-0.04 (-0.10 , 0.02)

borrowing loans with interest to cope with healthcare costs									
Healthcare utilisation outcomes	**N**	**Mean for non-eligible, HEF OD**	**Mean for eligible, HEF OD**	**Difference**	**Mean for non-eligible, non-HEF OD**	**Mean for eligible, non-HEF OD**	**Difference**	**Unadjusted difference in difference (point est and CI)**	**Adjusted difference in difference (point est and CI)**
Public health provider sought if ill in last 30 days	4249	0.31	0.35	0.04	0.24	0.30	0.05	-0.009 (-0.10 , 0.08)	-0.001 (-0.11 , 0.11)
Public health provider sought if seriously ill in last 30 days	682	0.37	0.47	0.10	0.49	0.45	-0.04	0.14 (-0.04 , 0.32)	0.17 (-0.05 , 0.39)
Private health provider sought if ill in last 30 days	4249	0.62	0.52	-0.10	0.67	0.57	-0.10	-0.006 (-0.07 , 0.06)	0.009 (-0.07 , 0.09)
Public hospital sought if seriously ill in last 30 days	682	0.21	0.27	0.06	0.34	0.29	-0.05	0.114 (-0.08 , 0.30)	0.129 (-0.08 , 0.34)
4 plus ANC visits during most recent pregnancy	3581	0.64	0.46	-0.17	0.68	0.49	-0.19	0.017 (-0.08 , 0.11)	0.005 (-0.08 , 0.09)
Institutional delivery for most recent pregnancy	4655	0.57	0.42	-0.15	0.59	0.47	-0.12	-0.018 (-0.12 , 0.08)	-0.003 (-0.07 , 0.07)
Healthcare status outcomes	**N**	**Mean for non-eligible, HEF OD**	**Mean for eligible, HEF OD**	**Difference**	**Mean for non-eligible, non-HEF OD**	**Mean for eligible, non-HEF OD**	**Difference**	**Unadjusted difference in difference (point est and CI)**	**Adjusted difference in difference (point est and CI)**

Wasting of children under 5 years	2041	0.11	0.12	0.00	0.10	0.11	0.01	-0.008	-0.017
								(-0.08 , 0.06)	(-0.10 , 0.07)
Wasting of children under 5 years, z score	2041	-0.62	-0.70	-0.08	-0.73	-0.75	-0.02	-0.06	0.02
								(-0.26 , 0.15)	(-0.21 , 0.25)
Stunting of children under 5 years	2041	0.35	0.47	0.12	0.31	0.36	0.06	0.063	0.048
								(-0.04 , 0.17)	(-0.06 , 0.15)
Stunting of children under 5 years, z score	2041	-1.55	-1.84	-0.29	-1.44	-1.68	-0.24	-0.06	-0.003
								(-0.32 , 0.21)	(-0.27 , 0.26)
Underweight of children under 5 years	2041	0.26	0.31	0.04	0.27	0.32	0.05	-0.006	-0.041
								(-0.09 , 0.08)	(-0.13 , 0.05)
Underweight of children under 5 years, z score	2041	-1.32	-1.55	-0.23	-1.33	-1.47	-0.14	-0.09	0.01
								(-0.27 , 0.10)	(-0.20 , 0.22)
Haemoglobin level of children under 5 years, g/dl	2313	128.23	125.24	-2.99	126.80	127.75	0.95	-3.937	2.791
								(-21.37 , 13.49)	(-14.39 , 19.97)
Anaemia status of children under 5 years	2294	0.44	0.48	0.05	0.45	0.48	0.03	0.017	-0.003
								(-0.13 , 0.17)	(-0.16 , 0.16)
Haemoglobin level of women 15-49 years, g/dl	4990	120.67	119.10	-1.57	120.98	117.82	-3.16	1.589	1.135
								(-1.93 , 2.92)	(-1.26 , 3.53)
Anaemia in women 15-49 years	4996	0.42	0.48	0.06	0.43	0.51	0.08	-0.018	-0.013
								(-0.09 , 0.06)	(-0.09 , 0.07)

Appendix 16 Results of difference in differences analysis using a poverty score threshold of <8 for non-eligible households and >24 for eligible households

Financial protection outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
Total expenditure at any health provider in last 30 days, if ill (USD)	2168	52.71	18.14	-34.57	43.64	28.84	-14.80	-19.77	-18.37
								(-62.02 , 22.47)	(-35.43 , -1.32)
Probability of zero expenditure at any health provider if ill in last 30 days	2168	0.01	0.05	0.04	0.01	0.02	0.01	0.04	0.04
								(0.01 , 0.07)	(0.01 , 0.07)
Probability of zero expenditure at a public health provider if ill in last 30 days	1277	0.01	0.14	0.13	0.03	0.06	0.03	0.08	0.13
								(-0.01 , 0.18)	(0.01 , 0.25)
Probability of out of pocket health expenditure exceeding 90th centile of spending amongst uninsured, if ill	2168	0.12	0.05	-0.07	0.09	0.05	-0.04	-0.03	-0.04
								(-0.08 , 0.02)	(-0.07 , -0.003)
Probability of selling assets and borrowing loans with interest to cope with healthcare costs	2173	0.17	0.17	0.00	0.10	0.17	0.07	-0.07	-0.02
								(-0.18 , 0.03)	(-0.09 , 0.06)

Healthcare utilisation outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (point est and CI)	Adjusted difference in difference (point est and CI)
Public health provider sought if ill in last 30 days	2173	0.29	0.35	0.06	0.24	0.27	0.03	0.04	0.08
								(-0.06 , 0.14)	(-0.03 , 0.19)
Public health provider sought if seriously ill in last 30 days	355	0.38	0.40	0.02	0.52	0.31	-0.21	0.23	0.19
								(-0.09 , 0.56)	(0.01 , 0.37)
Private health provider sought if ill in last 30 days	2173	0.64	0.51	-0.13	0.65	0.59	-0.06	-0.06	-0.07
								(-0.16 , 0.03)	(-0.15 , 0.02)
Public hospital sought if seriously ill in last 30 days	355	0.24	0.28	0.04	0.36	0.15	-0.21	0.25	0.22
								(-0.09 , 0.59)	(0.07 , 0.37)
4 plus ANC visits during most recent pregnancy	1905	0.66	0.42	-0.24	0.72	0.44	-0.28	0.04	-0.02
								(-0.10 , 0.17)	(-0.10 , 0.07)
Institutional delivery for most recent pregnancy	2490	0.64	0.36	-0.28	0.66	0.39	-0.27	-0.01	0.01
								(-0.16 , 0.14)	(-0.04 , 0.07)

Healthcare status outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (point est and CI)	Adjusted difference in difference (point est and CI)
Wasting of children under 5 years	1091	0.11	0.12	0.00	0.10	0.11	0.01	0.001	-0.02
								(-0.10 , 0.10)	(-0.10 , 0.06)
Wasting of children under 5 years, z score	1091	-0.55	-0.65	-0.10	-0.68	-0.70	-0.02	-0.08	-0.06
								(-0.37 , 0.21)	(-0.33 , 0.20)
Stunting of children under 5 years	1091	0.32	0.53	0.21	0.28	0.41	0.13	0.08	0.04
								(-0.085 , 0.25)	(-0.10 , 0.17)
Stunting of children under 5 years, z score	1091	-1.41	-2.03	-0.62	-1.28	-1.69	-0.41	-0.20	-0.14
								(-0.60 , 0.19)	(-0.49 , 0.21)
Underweight of children under 5 years	1091	0.23	0.35	0.12	0.24	0.33	0.09	0.04	0.05
								(-0.11 , 0.18)	(-0.05 , 0.15)
Underweight of children under 5 years, z score	1091	-1.19	-1.62	-0.43	-1.21	-1.46	-0.25	-0.19	-0.12
								(-0.48 , 0.11)	(-0.35 , 0.12)
Haemoglobin level of children under 5 years, g/dl	1232	127.53	123.33	-4.20	124.61	138.88	14.27	-18.46	10.88
								(-49.90 , 12.97)	(-11.69 , 13.44)
Anaemia status of children under 5	1222	0.39	0.53	0.14	0.48	0.49	0.01	0.14	0.09

years								(-0.02 , 0.29)	(-0.03 , 0.21)
Haemoglobin level of women 15-49 years, g/dl	2705	121.47	117.70	-3.77	120.73	117.78	-2.95	-0.82	-2.34
								(-4.28 , 2.64)	(-5.37 , 0.70)
Anaemia in women 15-49 years	2710	0.39	0.53	0.14	0.43	0.53	0.10	0.03	0.07
								(-0.06 , 0.12)	(-0.02 , 0.16)

Appendix 17 Results of difference in differences analysis, excluding SUBO districts

Financial protection outcomes	N	Mean for non-eligible, HEF OD	Mean for eligible, HEF OD	Difference	Mean for non-eligible, non-HEF OD	Mean for eligible, non-HEF OD	Difference	Unadjusted difference in difference (95% CI)	Adjusted difference in difference (95% CI)
Total expenditure at any health provider in last 30 days, if ill (USD)	3493	45.39	21.05	-24.34	35.30	24.59	-10.71	-13.64	-12.26
								(-42.99 , 15.71)	(-34.71 , 10.19)
Probability of zero expenditure at any health provider if ill in last 30 days	3493	0.01	0.06	0.05	0.00	0.02	0.02	0.03	0.04
								(0.01 , 0.05)	(0.01 , 0.06)
Probability of zero expenditure at a public health provider if ill in last 30 days	1277	0.01	0.13	0.12	0.00	0.04	0.04	0.07	0.07
								(0.02 , 0.12)	(0.01 , 0.14)
Probability of out of pocket health expenditure exceeding 90th centile of spending amongst uninsured, if ill	3493	0.13	0.07	-0.06	0.09	0.05	-0.04	-0.02	-0.03
								(-0.07 , 0.02)	(-0.07 , 0.01)
Probability of selling assets and borrowing loans with interest to cope with healthcare costs	3501	0.17	0.16	-0.01	0.13	0.17	0.04	-0.05	-0.05
								(-0.13 , 0.03)	(-0.11 , 0.01)
Healthcare utilisation outcomes	**N**	**Mean for non-eligible, HEF OD**	**Mean for eligible, HEF OD**	**Difference**	**Mean for non-eligible, non-HEF OD**	**Mean for eligible, non-HEF OD**	**Difference**	**Unadjusted difference in difference (point est and CI)**	**Adjusted difference in difference (point est and CI)**

Public health provider sought if ill in last 30 days	3501	0.33	0.35	0.02	0.25	0.32	0.07	-0.04	-0.06
								(-0.14 , 0.06)	(-0.16 , 0.05)
Public health provider sought if seriously ill in last 30 days	564	0.39	0.48	0.09	0.54	0.44	-0.10	0.19	0.19
								(-0.01 , 0.39)	(-0.06 , 0.44)
Private health provider sought if ill in last 30 days	3501	0.60	0.50	-0.10	0.66	0.57	-0.09	-0.01	0.01
								(-0.09 , 0.07)	(-0.08 , 0.10)
Public hospital sought if seriously ill in last 30 days	564	0.23	0.29	0.06	0.33	0.28	-0.05	0.11	0.12
								(-0.10 , 0.32)	(-0.13 , 0.38)
4 plus ANC visits during most recent pregnancy	3097	0.65	0.46	-0.19	0.66	0.50	-0.16	-0.04	-0.06
								(-0.15 , 0.06)	(-0.15 , 0.04)
Institutional delivery for most recent pregnancy	4039	0.59	0.42	-0.17	0.58	0.47	-0.11	-0.05	-0.03
								(-0.17 , 0.07)	(-0.11 , 0.05)
Healthcare status outcomes	**N**	**Mean for non-eligible, HEF OD**	**Mean for eligible, HEF OD**	**Difference**	**Mean for non-eligible, non-HEF OD**	**Mean for eligible, non-HEF OD**	**Difference**	**Unadjusted difference in difference (point est and CI)**	**Adjusted difference in difference (point est and CI)**
Wasting of children under 5 years	1782	0.12	0.11	-0.01	0.12	0.10	-0.02	0.004	-0.01
								(-0.06 , 0.07)	(-0.10 , 0.08)
Wasting of children under 5 years, z	1782	-0.61	-0.68	-0.07	-0.75	-0.73	0.02	-0.09	-0.05

score								(-0.33 , 0.14)	(-0.31 , 0.21)
Stunting of children under 5 years	1782	0.36	0.46	0.10	0.29	0.39	0.10	-0.001	-0.02
								(-0.12 , 0.11)	(-0.13 , 0.09)
Stunting of children under 5 years, z score	1782	-1.54	-1.82	-0.28	-1.40	-1.72	-0.32	0.05	0.10
								(-0.23 , 0.33)	(-0.16 , 0.35)
Underweight of children under 5 years	1782	0.27	0.30	0.03	0.25	0.32	0.07	-0.03	-0.06
								(-0.14 , 0.07)	(-0.16 , 0.03)
Underweight of children under 5 years, z score	1782	-1.30	-1.52	-0.22	-1.32	-1.48	-0.16	-0.06	0.02
								(-0.26 , 0.15)	(-0.17 , 0.22)
Haemoglobin level of children under 5 years, g/dl	2031	128.62	126.24	-2.38	127.64	129.40	1.76	-4.15	5.35
								(-25.35 , 17.05)	(-16.10 , 26.79)
Anaemia status of children under 5 years	2013	0.41	0.48	0.07	0.45	0.49	0.04	0.02	0.001
								(-0.15 , 0.19)	(-0.18 , 0.18)
Haemoglobin level of women 15-49 years, g/dl	4271	121.08	119.30	-1.78	120.52	118.03	-2.49	0.71	-0.04
								(-1.49 , 2.91)	(-2.20 , 2.11)
Anaemia in women 15-49 years	4277	0.41	0.48	0.07	0.42	0.52	0.10	-0.03	-0.02
								(-0.11 , 0.05)	(-0.10 , 0.07)